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French Population Theory since 1800. I *Joseph J. Spengler* 577

The Quantity of Capital and the Rate of Interest. II *Frank H. Knight* 612

A Comparison of Industrial Growth in France and England from 1540 to 1640. III *John U. Nef* 643

Mr. Keynes on Underemployment Equilibrium *Alvin H. Hansen* 667

An Index of Working Class Purchasing Power for Great Britain, 1929–35 *P. Sargant Florence* 687

Note on Factors Affecting Our Monetary Supply *Ira B. Cross* 691

Book Reviews 693

(See inside front cover)

Books Received 719

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THE JOURNAL OF POLITICAL ECONOMY

EDITED BY JACOB VINER AND F. H. KNIGHT, WITH THE CO-OPERATION OF THE OTHER MEMBERS OF THE DEPARTMENT OF ECONOMICS OF THE UNIVERSITY OF CHICAGO

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FRENCH POPULATION THEORY SINCE 1800.[1] I

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FRENCH writers on population fall roughly into five classes: (1) the contemporaries of Malthus (Say, De Tracy, etc.); (2) the liberal Malthusians; (3) the conditional Malthusians; (4) the Catholic school; (5) the anti-Malthusians, who include (*a*) the collectivist and non-collectivist writers who attributed poverty to the prevailing social institutions and (*b*) the writers who believed that fertility and population growth are governed predominantly by cultural factors unrelated to subsistence or production.

I. FRENCH CONTEMPORARIES OF MALTHUS

Both the social conditions and the intellectual climate which prevailed in France when Malthus' *Essay* appeared[2] insured it a

[1] Throughout this paper we shall use initials for the journals frequently cited: *Journal des économistes* (*J.d.e.*); *Journal of the Royal Statistical Society* (*J.R.S.S.*); *Revue des deux mondes* (*R.d.d.m.*); *Revue d'économie politique* (*R.d.e.p.*); *Revue politique et parliamentaire* (*R.p.e.p.*); *Annales de la Société d'Economie Politique* (*Annales*). In a forthcoming monograph, *France Faces Depopulation*, to be published by the Duke University Press, the writer deals with the purely depopulationist literature of France, with the efforts to control or to counterbalance French demographic trends, and with the various population movements which have developed in France.

[2] French editions appeared in 1809, 1824, 1845, 1852, 1907.

favorable reception.[3] The population was dense, and poverty and awareness of poverty were widespread.[4] Pre-Malthusian French writers had developed an unorganized set of observations more in accord with fact and probability than Malthus' well-integrated doctrine.[5] J. B. Say was Malthusian even before he had read

[3] An anti-Malthusian tone permeated a number of works appearing early in the century, however. See, for example, Ferrier, *Du gouvernement consideré dans ses rapports avec le commerce* (Paris, 1804); A. de Vitry, *Recherches sur les vraies causes de la misère et de la félicité publique* (Paris, 1815); Ecremont, *Entretiens et vues sur l'homme politique* (Paris, 1817); Fodéré, *Essai historique et moral sur la pauvreté des nations* (Paris, 1825); D'Harcourt, *Réflexions sur la richesse future de la France* (Paris, 1826); J. Peuchet, *Statistique élémentaire de la France* (Paris, 1805).

[4] Population pressure had led Arthur Young, a Physiocrat (Saint-Peravy, 1768), and a number of revolutionists to advocate the desirability of a smaller population and had aggravated some of the causes of the French Revolution. See, for example, L. Knowles, *Economic Journal*, XXIX (1919), 2 ff.; H. Sée, *R.d.e.p.*, XXXIX (1925), 1282–85. Chateaubriand, in 1802, said that "states never perish through lack, but through too great a number of men. Excessive population is the scourge of Empires." See *Génie du christianisme*, in *Œuvres complètes* (Paris, 1899), II, 35, 544.

[5] For summary accounts of French pre-Malthusian theory see: R. Gonnard, *Histoire des doctrines de la population* (Paris, 1923); C. E. Stangeland, *Pre-Malthusian Doctrines of Population* (New York, 1904); J. Delvaille, in *Revue d'histoire des doctrines économiques et sociales* (Paris, 1912), pp. 1–28; A. Landry, *ibid.* (1909), pp. 1–47, and in *R.e.d.p.*, XXIV (1910), 315–16, 366–68, 373; G. Weulersse, *Le mouvement physiocratique en France* (Paris, 1910), II, 268–95. With the substitution, in the fourteenth and fifteenth centuries, of a political and national approach to social problems for the earlier religious approach, populousness was advocated with and without qualification and promoted by word and law. In the eighteenth century an economic approach to the population problem, and many essentially Malthusian works, appeared, particularly in the closing decades. By 1798 French writers had recognized that population growth was governed by production and by the scale and standard of living; that the scale and standard of living were not fixed but were affected by various social institutions; that (e.g., see Cantillon) the way in which income was distributed and spent governed population growth; that, given a certain state of agricultural and industrial production, only a relatively fixed maximum population could be supported, and that, if this maximum was exceeded, positive checks would operate; that preventive checks could be and were being substituted for positive checks; that a population could be too large or too small, and that unlimited population growth was undesirable. Although limits to production were apparently noted, probably only two writers (Boisguillebert and Turgot) formulated a doctrine of diminishing returns. The Physiocrats, who were essentially Malthusian, in reply to the pro-populationist writers, argued that as population depended upon subsistence, the improvement of agriculture and the augmentation of the "net product" were the only means of fostering population growth, improvement in living conditions, and national power.

Malthus, for he advanced as a generally recognized truism the proposition that "other things equal, the population of a country proportions itself to its products," or "always to the quantity of its products."[6] Employing this proposition as a valid major premise, Say concluded that legal measures to increase population are effective only in proportion as they increase the quantity of products; that bad institutions check, whereas active industry fosters, population growth; that the demographic ravages of famine, etc., are soon repaired; that population will be less in proportion as wealth is unequally divided and customs are conducive to insobriety; that convent life checks population growth only in proportion as it fosters idleness; and that men's lots are governed not by the degree of population density per se but by "the quantity of products of which they dispose," a quantity that is determined in part by non-demographic factors, such as degree of civilization.[7]

While both the later editions of the *Traité* and the *Cours complet d'économie politique* (1828–29) reflect Malthus' influence, Say used "means of existence" in place of "means of subsistence" and failed to emphasize, as did Malthus, the need for "moral restraint." Say, however, was apparently not less pessimistic than Malthus. For although he believed that the per capita means of existence necessary to insure the supply of crude labor might increase and cause the level of real wages to rise, he did not anticipate "any great extension of the consumption of the labouring classes" and suggested that the wages of "the rudest and lowest class of labour would seldom rise . . . . much above" what was necessary to maintain and recruit the "numerical strength" of this class of labor. Despite man's

> foresight . . . . and the restraints imposed on him by reason, legislation, and social habits, the increase of population is always evidently coextensive, and even something more than coextensive, with the means of existence. It is a melancholy but undoubted fact that, even in the most thriving countries, part of the population annually dies of mere want.

[6] *Traité d'économie politique* (Paris, 1803), I, 391. Say cites Steuart, Hume, A. Smith, Verri, Montesquieu, Buffon, Necker, Condorcet, Canard, and G. Garnier, the translator of Adam Smith and in part a follower of the Physiocrats.

[7] *Traité*, pp. 391–96. Pre-Malthusian writers frequently had described celibacy as a check to population growth.

Since population depended upon production, numbers would be greatest, other things equal, where government was good, habits of industry prevailed, and circumstances were conducive to industry. He noted that French agriculture could support a larger non-agricultural population than France then possessed.[8]

In his enlarged *Cours* Say reaffirmed the foregoing views. Population is ultimately limited by, and is in proportion to, production, which is greater or less in proportion as men are civilized. Since the growth of capital relative to population conduces to happiness, it is necessary to encourage men to save rather than to procreate. Additional increments of population are desirable so long as they can produce the means whereon to live well; increments of population condemned to live miserably are to be dreaded. To Sismondi's criticism that rich families do not always replace themselves, Say replied that Sismondi failed to distinguish between "means of subsistence" and "means of existence," which latter term comprehends all things capable of satisfying human wants. Say himself believed that under propitious conditions numbers could treble in twenty-six years. Say denied that colonization depeopled the mother-country, and stated that human happiness and progress are promoted by the careful development of colonies in areas deserted or peopled only by savages. He described emigration as a mere palliative for overpopulation but added that the prevention of emigration in such circumstances would unleash the positive checks. In general, emigration was most efficacious when the indigent emigrated.[9]

Charles Ganilh, who was influenced by mercantilists, by A. Smith, Herrenschwand, and others, and who accepted the current belief in the beneficence of Nature, set down the following as the most probably absolute maxim in political economy: "Whenever an increase of produce is obtained at a smaller expense, there is

[8] *Treatise on Political Economy* (tr. from 4th ed.; Philadelphia, 1834), pp. 336–41, 345, 375–89; see also *Catechism of Political Economy* (tr. from 1st ed.; Philadelphia, 1817), pp. 133–34.

[9] *Cours complet d'économie politique* (2d ed.; Brussels, 1840), Part 6, pp. 368–402, especially chaps. i, v, xiii, and pp. 369, 371, 376, 379, 389, 400. Say criticized rulers who sought to encourage marriage among the poor, saying it was preferable to reduce taxes and increase the means of subsistence.

an increase of wealth; and an increase of wealth is always followed by an increase of population." Accordingly, since it is the increase of food, and not of other things, "which augments population," and since "population . . . . in civilized society is limited only by the scarcity of provisions among the lower orders," nations can effectively increase their numbers by engaging in commerce and manufacturing (which are superior to agriculture) and exchanging the products thereof for food. He believed that the "price of labour is . . . . independent of human passions and combinations" and little influenced by the "cheapness or dearness of provisions"; it "is fixed chiefly by the demand for labour [which] is constantly in proportion to the progressive, stationary, or retrograde state of national wealth."[10]

In part a follower of Say, Destutt de Tracy[11] was perhaps more cognizant than Say of the importance of the population problem and more pessimistic, supporting his pessimism, as E. Allix suggests,[12] by a crude wages-fund theory. Characterizing Malthus' work as "the last state of science on this important subject," De Tracy laid down the "general thesis that population is always

[10] He apparently believed that wage increases caused laborers to work harder, for he says, "A rise in the wages of labour . . . . does not even raise the price of the production of labour, because being better paid, the labourer works more, and his productions are both in greater quantity and of better quality." See *An Inquiry into the Various Systems of Political Economy; Their Advantages and Disadvantages; and the Theory Most Favorable to the Increase of National Wealth* (tr. from the original French ed. of 1809; New York, 1812). Citations from pp. 142, 145, 159–61.

[11] De Tracy said that Malthus erred in not distinguishing between the "means of subsistence," which are "alimentary matters," and the "means of existence," which are "the sum of the profits we can make by our labour, and with which we can procure for ourselves both subsistence and other enjoyments," which "consist in all the resources . . . . furnished by the arts and sciences" and "defend us against all the dangers and sufferings of every kind."

[12] *R.d.e.p.*, XXVI (1912), 424–51. Allix says of De Tracy (p. 450): "He perceived better than Say the consequences of the principle of population, from the point of view of the progress of societies, of the future of the workers, of the wages fund, etc. He agrees with Malthus on the importance of distribution and shows . . . . that it affects social prosperity as much as production. It is from Malthus that his work receives this tinge of pessimism or at least of resigned fatalism which changes, according to his own expression, romance to history, and removes the optimistic faith of Say. The multiplication of men and the increase of the inequality of wealth sets a limit to the progress of old societies and leads them to a stationary or retrograde state."

proportional to the means of existence," and stated that, because of progress in "the arts and sciences, ... particularly social science," population would continue to grow.

His assumption of a relatively fixed wages fund and of a relatively fixed number of jobs led him to conclude that population growth would probably depress wages. Like Franklin he reasoned that in agricultural countries, when all the territory had been occupied, wages would fall, permitting the establishment and extension of manufacturing industries, designed to supply local and foreign markets and capable of absorbing the growing population. Wages would eventually continue to fall, however, as population grew, inasmuch as the fund whence came the support of wage-earners would eventually prove incapable of keeping pace with the growth of the labor supply. For this fund was fed from two sources: (1) the income of passive capitalists, which remained constant; (2) the income of the active enterprisers, which also tended to remain relatively constant. He attributed the relative fixity of the second source to the fact that the more successful active enterprisers tended to become passive capitalists, whereas the less successful tended either to find their gains offset by their losses or to find it impossible to discover and enter profitable employments. "Misery begins, because all lucrative employments being filled, without a possibility of creating new ones, there is everywhere more labour offered than demanded."

He concluded, therefore, that, since population tends to be "always too great," since emigration is painful and can only temporarily relieve population pressure, and since misery always exists where there is population pressure, "*the interest of men, under every consideration, then is to diminish the effects of fecundity.*"[13]

[13] *A Treatise on Political Economy* (Georgetown, D.C., 1817; described as translated from the unpublished French original which was published in France in 1823 as *Traité d'économie politique*), pp. 62–63, 119–31. Author's italics. See also Allix, *op. cit.*, p. 435. Like G. Ortes and Say, De Tracy noted that population tends to be less dense where the ownership of wealth is more concentrated (*op. cit.*, p. 159). Some of De Tracy's views resemble those of his American contemporaries and correspondents. See article by writer, *American Economic Review*, December, 1935; also G. Chinard, *Jefferson et les idéologues* (Baltimore, 1925), and *The Correspondence of Jefferson and Du Pont de Nemours* (Baltimore, 1931).

Man multiplies rapidly wherever he has in abundance the means of existence. Population never becomes retrograde, nor even stationary, but because these means fail. Amongst savages it is soon checked, because their means are scanty. Civilized people have more, they become more numerous in proportion as they have more or less of these means, and make better use of them. But the increase of their population is arrested also. Then there exists always as many men as can exist. Then it is also absurd to suppose they can be multiplied otherwise than by multiplying their means of existence. Then finally it is barbarous to wish it, since they always attain the limits of possibility, beyond which they only extinguish one another.[14]

Greater optimism marks the population theory of two Physiocratic contemporaries of Say and De Tracy. Du Pont de Nemours objected to Malthus' emphasis upon moral restraint.[15] The poor could not be taught the moral restraint common among the well-to-do. Moreover, moral restraint could solve the population problem only if the population of the entire world practiced it, for if but one nation practiced it, the resulting increase of wages would attract immigrants, whose coming would push wages back to the

[14] De Tracy, *op. cit.*, p. xxiii.

[15] Du Pont had, already in 1766, criticized Expilly, who considered population to be the measure of a nation's wealth and power. Du Pont, aware of the misery in France, replied that it was the condition of the population which was important, not mere numbers. He included aid to the poor among the functions proper to government. He did not advocate moral restraint, but emphasized the need to make subsistence outdistance population, saying that the establishment of political and economic liberty would produce this effect. In 1771 he stated that, thanks to the intent of Providence, man's numbers increased as production increased, "the difficulty of subsistence" constituting the only check. Like Franklin, he said that America's population doubled every twenty-five years because of the steady progress in the production of consumables. He added, moreover, that emigrants favor countries where the possibilities of production are good and men are assured of their rights. He favored population growth, even though it might temporarily depress wages, for he believed that such growth fostered the growth of culture and helped to push man along the endless road of progress, and that invention, which had elevated the lot of the poorest civilized man above that of the richest savage, would continue.

"The perfectability of the human spirit, vigorously excited by the urgent interest and by the very active competition of a very great number of persons . . . . who are avid for enjoyments and want the greatest possible amount thereof at the least possible expense, the perfectability of the human spirit daily brings on the inventions which facilitate gratification . . . . at reduced expense."

See G. Schelle, *Du Pont de Nemours et l'école physiocratique* (Paris, 1888), pp. 38–39, 121–23, 117–18, 280.

general level and wipe out the momentary gains of the prudent domestic population. Du Pont observed, further, as in his earlier works, that the principle of population was beneficent in that it spurred man on to increase his resources as his numbers and needs increased; that the solution lay primarily in increasing production; that so long as population growth was not artificially encouraged and no obstacles were placed in the path of production, a satisfactory equilibrium could and would be maintained between numbers and resources.[16] In two memoranda prepared for Jefferson and Madison in 1816, he indicated that, while England's population was in a perilous position because agriculture had not kept pace with industrial development and population growth, the United States, with its abundance of land and resources, did not need to anticipate danger from population growth and industrial development for many centuries. America's land would not be fully cultivated for six hundred years, her population would probably continue to grow for one thousand years. Given such conditions, no one industry would operate to the disadvantage of others.[17]

J. M. Dutens, follower of the Physiocrats, laid down three principles: (1) population is limited in every country by the means of existence which this country offers; (2) population increases always in virtue of the products of a country, or, in other terms, in virtue of the revenues of all kinds of the country; (3) in each nation that part of the population which forms the manufacturing, commercial, liberal, and guardian-of-the-laws class increases because of the excess of the total product of the earth over the portion of the same total product consumed during the production period, or, in other terms, because of the net product. Dutens advocated that governments simultaneously promote the growth both of population and of the means of existence in such

[16] *Examen du livre du Malthus* (Philadelphia, 1817). See Schelle's summary (*op. cit.*, pp. 378–80).

[17] Chinard, *Correspondence*, pp. 241, 244, 255. While Du Pont accepted the "net-product" doctrine with qualification, he modified his position on the relative importance of agriculture, saying that, while agriculture was the source of wealth, industrial development was dangerous to a society only when it took place at the expense of agriculture (*ibid.*, pp. lvii; Schelle, *op. cit.*, pp. 77–79).

a manner that the former never pass the latter and, as a consequence, cause misery, disease, and death in the lower classes. Although he believed that agricultural production could be increased by shifting certain non-agricultural workers (soldiers, sailors, domestics, luxury-producers) to agriculture, he did not in general favor increasing the relative number engaged in agriculture. For he believed that such a shift would push life to a subsistence level and would be contrary to the irresistible progress of human society toward perfection.[18]

II. FRENCH LIBERAL SCHOOL

Virtually every French defender of Malthus belonged to the liberal school, in the hands of whose members Malthusianism became an integral part of a broader doctrine of individual responsibility. In substance the liberals believed that, given free competition, individual responsibility, and the diffusion of prudence and forethought, capital per head would accumulate, wage levels would rise, and the lot of the masses would steadily improve; that in the absence of these conditions population would press upon subsistence, inasmuch as population had a greater inherent capacity to increase than had production; that Malthus had performed a great service in showing that, contrary to mercantilist opinion, continuous population growth is not an unmixed blessing. The influence of liberal demographic theory, ascendent until about 1860–70, declined under the combined impact of alarm over the decline in French natality and of the views of critics of the liberal philosophy.[19]

[18] *Philosophie de l'économie politique* (Paris, 1835), II, 121, 125–27, 129–33. He denied Sismondi's reply to Malthus to the effect that a nation could import food, saying that few countries fell in this category.

[19] Among the lesser writers who accepted some of the tenets of liberalism and were disciples of Malthus are: Charles Comte, *Traité de législation* (Paris, 1835), III, 219 ff., IV, 209–12, and notice on Malthus in 1845 French edition of the *Essay;* Mignet, *J.d.e.*, 1st ser., XIV (1846), 277–78; a critic of Engels, *ibid.*, 1st ser., XIV (1846), 401–2; the author of *Le moyen d'être heureux* (Paris, 1846); De Colmont, *J.d.e.*, 1st ser., XX (1848), 196–97; M. Darbell, *ibid.*, 2d ser., XXXVIII (1863), 156–57; F. Wolowski, *ibid.*, pp. 158–65; J. L. Giresse, *Essai sur la population* (Paris, 1867). R. Guyard, who believed the principle of population to be fatal to dreams of the future improvement of man's lot, advocated limiting children to three per family (*Essai sur l'état du paupérisme en France et sur les moyens d'y remédier*

P. Rossi, Italian Catholic who became a French citizen and Say's successor at the Collège de France, concluded that, since invention and progress could not adequately counterbalance the tendency of returns to diminish if population continued to grow, the future of man's lot depended essentially upon whether or not the workers (who were largely responsible for their lots) prudently deferred marriage and thus checked their increase. Hence Rossi advocated, as had Malthus, that population growth be in no way encouraged by word or law and that the population be taught the truths of political economy[20] and the need to exercise moral restraint and thrift. "Schools and savings banks are able, themselves alone, to change the face of society."[21] He was confident (and offered as evidence the slow growth of the Norman population) that as man passed out of barbarism (where Malthus' principle "is a fatal, inevitable law") into civilization, the development of new wants and of reflection and forethought would preserve a satisfactory equilibrium between numbers and resources. He believed that early marriages produced feeble children; that high natality was accompanied by high child mortality and the destruction of capital embodied in children; that emigration was a painful and inadequate source of relief for rapid population growth; that charity should be reserved for the sick, the aged, and the disabled; that a small competent population was preferable to a large, poverty-stricken population; that a freely competitive development of colonial resources was preferable to their develop-

(Paris, 1847). L. Cador, who attributed French social upheavals to population pressure, advocated fixing the legal minimum marriageable age at thirty for men and twenty-one for women (*Subsistence et population* [Paris, 1850]). Translations of the pro-Malthusian work of the weil-known Spanish economist, D. A. Florez-Estrada (*Cours éclectique d'économie politique* [Paris, 1833], I, 295–330) were popular in France (*J.d.e.*, 1st ser., I [1842], 469).

[20] F. de la Farelle advocated in 1846 that political economy be taught in all advanced educational institutions (*J.d.e.*, 1st ser., XIV [1846], 100–101).

[21] *Cours d'économie politique* (Brussells, 1840), I, 200–256; Introduction to Malthus' *Essay* (Paris, 1845), reprinted in *J.d.e.*, 1st ser., X (1845), 324–47. The establishment of institutions to promote saving was advocated as a means of inculcating thrift, preventing poverty, and developing a rational outlook in respect to family size. For example, see E. de Girardin, *ibid.*, 2d ser., XXVII (1860), 283; De Gerando, below, n. 41; other writers on the problem of poverty.

ment under the aegis of mercantilism; that colonization could neither depeople a mother-country nor serve as a substitute for moral restraint.[22]

Michel Chevalier, a former Saint-Simonian and an engineer, succeeded Rossi at the Collège de France.[23] Although Chevalier believed the productive power of the community to depend upon many factors,[24] he described Malthus' thesis as the answer to the doctrines of the revolutionists, then active in France. For, said Chevalier, if there are limits to the augmentability of subsistence, man's lot cannot be improved by charity, revolutionary change, or mere societal reform. His salvation depends upon himself, upon his observance of the precepts of thrift, prudence, and reason; for the level of wages is fixed primarily by the ratio of capital to population and can rise only if capital[25] outstrips population. Therefore numbers must be held in check, and capital accumulation must be promoted. Otherwise wages will not rise but will fall below the subsistence level, and famine will result.

> The more population multiplies, relative to capital, the more will wages descend. They will fall to the detriment of public health, in spite of the appeals of Christian charity, of the cry of wounded humanity. They will fall until the unfortunate workers are reduced to the minimum of subsistence, to the coarsest foods.[26]

[22] *Cours*, I, 200–256; II, 206–38.

[23] The French Société d'Economie Politique protested both the temporary suppression in 1848 of the chair of political economy at the Collège de France and the slighting of Malthusianism by a governmental commission on curricula. See *J.d.e.*, 1st ser., XX (1848), 125–27.

[24] In his *Cours d'économie politique* (Paris, 1841–43), Chevalier advocated as means to increase the productive power of France: (*a*) development of a national transportation system; (*b*) commercial and vocational education; (*c*) the establishment of credit institutions designed to provide capital to all competent persons in need of it. See also *R.d.d.m.*, December 15, 1844, p. 1081; March 15, 1850, pp. 961–94; July 15, 1850, pp. 305–47.

[25] In one place he includes under capital the "instruments of labor and the [consumable] products of labor" (*J.d.e.*, 1st ser., XXII [1849], 352); in another place he includes also "the ability to work, the desire to work, zeal for the prosperity of the work shop" (*ibid.*, 1st ser., XXI [1848], 43).

[26] *R.d.d.m.*, March 15, 1848, pp. 1061–66. See also *J.d.e.*, 1st ser., XVI (1847), 219–24; XXII (1849), 352. Chevalier suggested, as did several later writers, that

Joseph Garnier, editor of the *Journal des économistes*, and in part a disciple of W. T. Thornton, was Malthus' most active French exponent. Malthusianism, Garnier contended, embodied four truths: (1) work and foresight are the chief keys to familial well-being; (2) family heads are duty-bound to procreate no more children than they can support; (3) it is dangerous to tell the masses that they need not be concerned over the number of children they bring into the world; (4) the poor have no right to assistance or to a minimum wage, the granting of which right is logically equivalent to establishing communism.[27]

Garnier's opinions follow. In the absence of moral and physical checks, population increases incessantly and geometrically, that is, far more rapidly than the means of subsistence can be increased even though man may at the moment have the aid of cultural improvements, industrial and economic progress, a growing capital supply, and accessibility to exploitable land and resources. In other words, given the tendency of returns to diminish (Garnier cites Mill and Senior), population has an actual and organic tendency to outstrip subsistence, whose quantity forcibly limits actual population and must be increased if numbers are to increase. The human will can and, on moral and social and familial grounds, should prevent population's growing beyond its capacity to produce or procure subsistence. Since, in the absence of such preventive control, the chief cause of misery (excess population)

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were a spirit of emigration to develop in France, the French birth-rate might rise, inasmuch as potential parents, seeing prospects abroad for their children, would no longer hesitate to procreate. See *Annales*, X (1873–74), 47–48.

[27] *J.d.e.*, 2d ser., XXXVIII (1863), 114–15; also *ibid.*, 1st ser., XX (1848), 375 ff.; also *Du principe de population* (Paris, 1857), in which (pp. 46–48) he rejects as invalid the following criticisms of Malthus: (1) that the checks to population have not operated; (2) that population proportions itself to but does not exceed subsistence; (3) that Providence equilibrates numbers and resources; (4) that man's personal and moral interests always cause man to act in a way to improve his lot; (5) that the human species is steadily perfecting itself; (6) that population growth counterbalances itself by increasing the advantages of division of labor; (7) that agricultural production had outstripped numbers. For Garnier's life and bibliography see *J.d.e.*, 4th ser., XVI (1881), 5–26. In 1845 the Academy awarded Garnier a prize for his Malthusian essay on poverty. See *ibid.*, 1st ser., XV (1846), 105 ff.

develops and sets in motion the positive check (mortality), families and individuals should be compelled to rely on themselves, on their own labor and conduct and foresight, on prudence both in deferring marriage and within marriage. Furthermore, it is antisocial to encourage population growth in any way, to say that God controls reproduction and will provide for man, or to advocate as cures for poverty political action, ephemeral charity, state relief, or a pretended reorganization of society (e.g., socialism). When poor relief is provided, it should be made available in a workhouse and not at home, and it should not exceed the lowest prevailing wage. In general, given prudence and individual responsibility, population growth will be checked, and well-being will increase and will in turn make control of population growth easier and more certain, inasmuch as population pressure is largely caused by the lack of foresight and the too early and too prolific marriages to which lack of well-being gives rise. Moreover, for excess population, a condition that exists whenever an employable portion of the population cannot regularly earn enough to buy the necessities of life, only temporary relief is provided by capital accumulation, by the cheapening of necessities through international commerce, and by extensive emigration. Ultimately control of numbers, through prudence in contracting marriage and within marriage, is the only permanent cure for, and preventive of, overpopulation.

While density of population is not always a sign of national strength, and while a "smaller comfortable and prosperous population" may be more powerful "than a larger and suffering population," the principle of population, when regulated by prudence, can increase the density of population, can augment the economic effectiveness of society, and may ferment progress. In short, Garnier believed that marital prudence produces comfort, reduces fatigue, diminishes competition among workers, and thus raises wages, develops conjugal qualities and filial respect, and promotes general well-being.[28]

[28] *Du principe*, pp. 14–15, 30–31, 201–21; see also *J.d.e.*, 1st ser., XV (1846), 105–37. Garnier's views were shared by his coeditors (*ibid.*, 1st ser., XII [1845], 216) and approved by C. Lavollée (*R.d.d.m.*, August 1, 1856, pp. 687–88); they were attacked by Proudhon and by Catholic writers. Commenting on the mathe-

Believing that the allegedly frequent resort to abortion and infanticide proved that Malthus' "moral restraint" was inadequate, that many married people were incapable of continued abstinence, and that many unmarried were unable both to defer marriage and live continently, Garnier, by implication at least, advocated coitus interruptus,[29] as did Charles Dunoyer on similar grounds. Although a liberal economist, Dunoyer believed that many institutions and circumstances held men "in a permanent state of ignorance, misery, and degradation." He criticized those who advocated a high birth-rate as conducive to colonization, saying that "abuse of the generative forces" and rapid population growth gave rise to the sickly and the unsound stocks, whereas slow and orderly growth gave rise to "healthy and vigorous stocks."[30] As a departmental prefect, he officially condemned almsgiving and counseled prudence in regard to marriage.[31] When, because of this advice, the clergy attacked him, Dunoyer

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matical law of population developed by Verhulst (*Recherches mathématiques sur la loi d'accroissement de la population* [Brussels, 1845]), Garnier pointed out that one could develop no empirically valid predictive formula until one had discovered the functional relation between the preventive and destructive checks on the one hand and the density of the population on the other (*J.d.e.*, 1st ser., XII [1845], 276–77).

[29] Garnier stated that Onan had been punished, not for his act per se (Gen. 38:4–10), but for his violation of the law of the levirate. Garnier charged Tissot with having confused the meaning of the word "onanism" by making it cover all forms of seminal loss. See *Du principe*, chap. v; *J.d.e.*, 2d ser., XXXVIII (1863), 148–55; article on "Population" in *Dictionnaire de l'économie politique* (Paris, 1864), II, 388, 395–97. At Garnier's request the *J.d.e.*, 4th ser., XI (1880), 241–48, carried an article recommending English works on birth control (e.g., those of Knowlton, Carlile, etc.), an article subsequently appended to the 1885 edition of *Du principe*.

[30] See *De la liberté du travail* (Brussels, 1846), pp. 214–21, first published in 1825 as *L'industrie et la morale*; *J.d.e.*, 1st ser., I (1842), 137–42; *Notices d'économie sociale* (Paris, 1886), pp. 243 ff.

[31] See Garnier, *Du principe*, p. 92; *J.d.e.*, 1st ser., XXXII (1852), 423–24. Concerning similar counsel in other departments and the use of prizes to encourage thrift and prudence, see *ibid.*, 1st ser., XXXII (1852), 423; J. Bertillon, *La dépopulation de la France* (Paris, 1911), p. 210. In 1848 it was maintained that vaccination was to be condemned because it interfered with the natural law which tended to preserve equilibrium between population and subsistence. See J. Jung, *Moyens actuellement proposés pour favoriser l'accroissement de la natalité en France* (Paris, 1903), p. 37.

replied in a memoir in which he characterized as "unpardonable" the acts of those who procreate without ascertaining whether they can provide a happy life for children.[32]

Although J. Courcelle-Seneuil believed, as did A. J. Dupuit,[33] that man's lot could be permanently improved only if production were increased and men were induced to defer marriage until they could earn enough to satisfy their wants, he stressed even more than had Say, De Tracy, Cantillon, and certain other pre-Malthusian writers, the effect of the distribution of income upon the scale of living and the relation of this scale to population growth. The population of a community at any time, he said, would equal the sum of the individual incomes (i.e., the total means of existence) received by the community, minus the sum of the inequalities, divided by the minimum average individual consumption.[34]

[32] *Mémoire à consulter sur quelques-unes des principales questions que la Révolution de juillet a fait naître* (Paris, 1835), pp. 176 ff. See also Garnier, *Du principe*, pp. 92–97. Dunoyer seems to have favored onanism. L. Leclerc, a friend of Garnier and Dunoyer, was willing to advise deferment of marriage but not prudence within marriage, in view of medical discoveries relative to fecundation, discoveries which had rendered Malthus' conception of moral restraint "naïve" (*J.d.e.*, 1st ser., XXXIV [1853], 456–61; XXXV [1853], 137–38). Later Dunoyer and other liberals expressed concern at the lowness of French natality (*ibid.*, 2d ser., XIII [1857], 229–33; XIV [1857], 137–40).

[33] Dupuit, who rejected all the arguments of the anti-Malthusians, said: "All that does not contribute to augment production and diminish population is radically worthless. . . . . Fecundity of population is a cause of misery over which no economic measure can triumph. The principle of prudence, which consists in having children only when one is rich enough to rear them well, physically and morally, is observed in France in numerous departments. It were possible then to be so in all departments." See *J.d.e.*, 2d ser., XLVII (1865), 30, 33, 36; *Annales*, V (1862–64), 89–93; *J.d.e.*, 2d ser., XXXVII (1863), 344–46. For a contemporary evaluation of the work of Dupuit, who is known today chiefly for his writings on utility and differential pricing, see E. L. Fleury, *ibid.*, 3d ser., VII (1867), 161–87.

[34] $P=(r-i)+c$, where $P=$ the resulting population, $r=$ the sum of incomes or the available means of subsistence, $i=$ the sum of inequalities, and $c=$ the minimum of individual consumption. Thus, if $r=1{,}000$ and $c=10$ and there are no inequalities, the population will be 100. But if 4 persons consumed 140 in excess of the minimal consumption, the population would be only 86, i.e. $(1{,}000-140)+10$. Courcelle-Seneuil, an admirer of J. S. Mill, observed, too, that given a stationary state of the arts, continued population growth would necessarily depress per capita income; that the operation of the preventive and positive checks preserved a close relationship between the respective movements of wealth and population. See *Traité théorique*

In some respects De Molinari's appraisal of Malthus resembles that of Sismondi. Three problems had faced every human society: proportioning numbers to subsistence, producing new generations at minimum cost, checking dysgenic selection. In primitive, slave, and servile societies these problems were solved by custom, law, and authoritarian regulation. Malthus had exposed the evils caused by the too rapid population growth which had taken place when the régime of liberty had replaced the régime of authority (i.e., slavery and feudalism) and had removed the authoritarian checks to population growth. Malthus had indicated

> two essential truths: first that population is limited by its means of existence and that it is inevitably brought back to this limit when it has exceeded it, whence it follows that man is obliged to restrain and regulate the penchant which presses him to reproduce himself, as well as all his other penchants, or his other passions; second, that the amelioration of the condition of the suffering classes does not depend solely, as the precursors of socialism pretended, upon the reform of political and social institutions, that it implies also the reform of [man's] government of himself.[35]

De Molinari rejected Malthus' pessimism, saying that the genetic instinct was held in check by three factors: (1) man's capacity to control reproduction, a capacity which differentiates him from inferior species; (2) the paternity sentiment which excites men to accumulate and preserve property for future generations; (3) the operation of the hedonistic principles of pleasure and pain, and the functioning of the aesthetic sentiment which leads men to select attractive mates, thus promoting eugenic selection.[36] De Molinari counseled sexual prudence, saying it was a precondition

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et pratique d'économie politique (Paris, 1858), Book I, chap. v; *La société moderne* (Paris, 1892), pp. 197–98; *J.d.e.*, 2d ser., XX (1858), 187–88. H. Denis accredits Courcelle-Seneuil with anticipating the doctrine of the antagonism between the nutritive and the generative functions (*Histoire des systèmes économiques et socialistes* [Paris, 1907], II, 107–8). Courcelle-Seneuil's formula was employed by A. Liesse (*Leçons d'économie politique* [Paris, 1892], pp. 44–52, 70–74), approved by A. Cochut (*R.d.d.m.*, April 1, 1859, pp. 549–51, 569–73) and A. Naquet (see below), and criticized by M. Block (*Les progrès de la science économique*, I, 540–41), who said that the formula merely indicated the necessity of using "means of existence" in place of "means of subsistence."

[35] *Viriculture* (Paris, 1897), p. 69; also pp. 23–34, 49–68, 128.

[36] *Ibid.*, pp. 15–19.

to the accumulation of the capital whereon depended both the level of wages and the volume of employment available.[37] He said that the burden of excess population would fall upon labor in the form of lowered wages, and that taxes for poor relief likewise would fall upon labor if these taxes checked capital accumulation or drove from a country the mobile factors of production.[38]

De Molinari held that population has a supply price, that numbers will continue to grow until further increments push per capita income below this supply price, that natality falls in proportion as children produce less than they cost. He rejected the arguments of the pro-populationist writers in every respect, saying that the French population would grow if child labor were facilitated and if governmental checks to production (e.g., economically unproductive governmental expenditures, taxes, tariffs, sanctioning of monopolies, etc.) were eliminated. He suggested the establishment of credit institutions to provide funds to cover the costs of raising children, repayment to be made out of the income produced by those whose procreation was thus financed. Such institutions would serve to regulate population quantitatively and qualitatively, for credit would not be advanced to finance the reproduction of the unfit or of persons in excess of what the labor market could absorb at prices adequate to cover their costs of production. In general he believed that the right number of biologically fit persons would be procreated so long as the competitive price system was allowed to function freely; that the existence of nations depended upon their observance of the rules of competition; that the application of credit and insurance to reproduction and the accumulation of the knowledge necessary to mobilize labor economically would bring population growth within the beneficial control of the system of competitive pricing.[39]

[37] He assumed, as did Cherbuliez, relatively fixed proportions in production between capital and labor.

[38] *Cours d'économie politique* (Paris, 1855), pp. 375–79; *Annales*, V (1862–64), 123. He said that the "net product" of the productive factors could be used for pleasure, war, the support of an excess population, or the expansion of capital equipment.

[39] *Viriculture*, Preface, pp. 87, 93, 145, 152–53; *Ultima verba* (Paris, 1911), pp. 151–56; *J.R.S.S.*, I. (1887), 183–96; *J.d.e.*, 4th ser., XXXVI (1886), 320 ff. Other

Although the influence of productivity and the standard of living upon wage levels was noted by nearly all French writers,[40] in part even by the exponents of the wages-fund doctrine, the latter theory, or a population-capital-ratio doctrine, was employed by a number of writers. M. T. Duchatel employed both the wages-fund doctrine and the law of diminishing returns to show that control of population growth constituted the only cure for poverty, whose chief cause was the inadequacy of wages, an inadequacy attributable to disequilibrium between population and the sum of wealth, whence the means of existence were derived.[41] He believed that the average rate of wages depended upon the ratio of workers to the "sum . . . . appropriated each year in society to pay for labor," and could be increased only by decreasing the number of workers relative to this sum.[42] In view of this theory and in view of the fact that the augmentation of the produce of a given community was limited by diminishing returns at the inten-

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writers also stressed the necessity of increasing production to increase population growth (*Annales*, X [1873–74], 54–55; *J.d.e.*, 4th ser., III [1878], 345–46, XXXI [1885], 285–95); see also Lascaux below.

[40] Most French writers, whether or not exponents of the wages-fund doctrine, believed that the standard of living regulated the supply of labor and thus set a limit to the decline in wage levels. Both M. Block and E. Levasseur state that most French writers assigned the main wage-determining influence to productivity. Levasseur named as productivity theorists Beauregard, E. Chevalier, Block and P. Leroy-Beaulieu. We note others below. Some writers (e.g., B. Lavergne, *La théorie des marchés économiques* [Paris, 1910]) have neglected the supply side, saying that, since the present generation of workers is given, a marginal productivity explanation suffices. See M. Block, *Les progrès* ... , II, 276; Levasseur, *The American Workman* (Baltimore, 1900), p. 390.

[41] *Considérations d'économie politique sur la bienfaisance, ou la charité* (Paris, 1836), p. 49. First published in 1829, this work was awarded a prize by the French Academy, as was that of F. M. L. Naville (*De la charité legal*, published in 1836), who favored private, as against public, charity and who, like Duchatel, approved of Malthus. J. M. de Gerando gave some support to Malthusianism and favored private, as opposed to public, charity in his prize-winning *De la bienfaisance publique* (Paris, 1839). See also his less Malthusian *Des progrès de l'industrie dans leur rapport avec le bien-être physique et morale de la classe ouvrière* (Paris, 1845); also A. Cochut, *R.d.d.m.*, August 15, 1839, pp. 547–78. More than fifty essays were submitted in the Academy's two contests on the causes of and cure for poverty. See *J.d.e.*, 1st ser., XV (1846), 105.

[42] *Considérations*, pp. 45–50, 71–77.

sive and extensive margins and by transportation costs, limits over which science was "powerless to triumph," Duchatel concluded that "moral restraint" and limitation of population growth, rather than public relief and emigration, constituted the only basic cure for poverty, and that the military, industrial, and other arguments for population growth were unsound.

> It is within the power of the laboring classes to regulate the measure of their wages by bringing into their marriages the same foresight as in the disposition of their moderate incomes. This foresight is necessary, and alone is able to preserve the worker from indigence; for such are the natural laws of the formation of capital, that, with the exception of nascent societies, they permit only a slow augmentation of the number of men. Without the aid of prudence, which arrests the progress of population, misery is inevitable.[43]

Duchatel was optimistic concerning the future, however, for he supposed that intelligence, foresight, and restraint would become diffused throughout the population; that "prudence in marriage" would free the laboring classes of the "evils of misery" and poverty.[44]

Léon Faucher, disciple of J. S. Mill and McCulloch, stated that wages were not necessarily governed by the fertility of the soil, by the wealth of the population, or by the extent of industrial operations. Rather, wages were fixed by the ratio of population, or workers, to "the capital which a people is able to consecrate to the remuneration of labour." He counseled the workers to practice the prudence of the middle classes and advocated a system of small proprietorship under which each could own property and hope to better his lot. For superabundance of population he recommended both the augmentation of production and capital and the emigration of the less desirable groups.[45] Several writers who

[43] *Ibid.*, pp. 153–54, 85–96, 105–6, 157–312, 314–29. Duchatel followed the English writers in supposing that, as population grew and the real cost of providing wage goods rose, the proportionate share of capital, the rate of profit, and the rate of capital accumulation would fall (*ibid.*, pp. 96–105). While he used the term "means of subsistence," he considered "means of existence" more accurate.

[44] *Ibid.*, pp. 64–65, 112–15, 321, 357–58. O. d. Haussonville was less optimistic (*R.d.d.m.*, July 1, 1885, pp. 61–99; December 15, 1885, pp. 821–61).

[45] Article "Salaires" in *Dictionnaire de l'économie politique* (Paris, 1864), II, 571–81. He believed that emigration rather than free trade was responsible for the comfort of the British population. Faucher did not believe that capital accumula-

believed that the standard of living, or subsistence, set a lower limit to wage levels, and who subscribed in general to the doctrines of the liberal school, agreed in substance with Faucher in making wages dependent upon the ratio of workers to the capital designated for the remuneration of labor.[46]

Although the French liberals rejected socialism, only a few besides Garnier employed Malthusian arguments against socialism. G. du Puynode, critic of all Malthus' critics, declared that charity destroyed the very capital whence came labor's support, and insisted that the cure for poverty lay in man himself, in the practice of prudence, foresight, thrift, saving, and deferment of marriage, in "moral restraint . . . . the crown of Malthus' system, as the difference between the increase of men and of products is the base." Laws and governments could not correct conditions traceable to man's imprudent multiplication, conditions correctable only by the practice of moral restraint and thrift.[47] A. E. Cher-

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tion, per se, could give impulsion to productive power and employment (*ibid.*, I, 612). J. B. Say had said (*Treatise*, p. 389) that capital could not by itself suffice "to set in motion" urban industry.

[46] See A. Clément, *J.d.e.*, 1st ser., XXXIII (1852), 131; XXVI (1850), 246, 2d ser., VII (1855), 66, 73; *Recherche sur les causes de l'indigence* (Paris, 1846); E. Daire, *J.d.e.*, 1st ser., XV (1846), 59; XIII (1845), 208–13; XVI (1846), 278, 387–90; M. E. Worms, *Exposé élémentaire de l'économie politique* (Paris, 1880), p. 314. J. Garnier observed that wages were governed by the amount of work available and by the power to remunerate labor derived from capital (*J.d.e.*, 1st ser., XVIII [1847], 211; *Eléments de l'économie politique* [Paris, 1845], chap. xx). Also De Tracy, Cherbuliez, Chevalier, Lascaux, and Florez-Estrada. H. Baudrillart referred to capital as the source or "fonds" whence wages are paid. See *Economie politique populaire* (Paris, 1869), p. 239.

[47] Du Puynode, *Des lois du travail et de la population* (Paris, 1860); *J.d.e.*, 1st ser., XX (1848), 25–36; XXIII (1849), 147–55; 2d ser., IV (1854), 5–33; V (1855), 53–78; VII (1855), 28–51; VIII (1855), 343–66; 3d ser., XXV (1872), 349–89, where (pp. 379–80) he criticizes J. S. Mill for espousing the cause of trade-unionism. L. de Lavergne complimented Du Puynode on his courageous defense of Malthus, saying "this doctrine of Malthus, so injured, so calumniated, is perhaps of all the theses of political economy the most evident in itself and the most useful to humanity." (See *R.d.d.m.*, March 1, 1862, p. 230.) Although De Lavergne subsequently became alarmed at the lowness of French natality, he always remained a Malthusian. See *J.d.e.*, 2d ser., VI (1855), 381; XIII (1857), 225–28; XXXIV (1862), 134–35; XXXVII (1863), 449 ff.; XL (1863), 491 ff.; 3d ser., V (1867), 456–57; XLVI (1877), 125–29; *L'agriculture et la population* (Paris, 1865), pp. 305–43, 418–19, 443–68.

buliez, Swiss-French economist, exponent of a wages-fund theory, and an ardent individualist and Malthusian, condemned philanthropy and described regular and assured poor relief and charity as much worse than irregular private charity on which none could rely with certainty. Philanthropy, he said, was based on the assumption that society was responsible for the vices and the misfortunes of the individual; therefore it was socialistic.[48] Moreover, philanthropy augmented and fostered the very pauperism it was designed to alleviate.[49]

A. Naquet contended that collectivism would destroy individual responsibility and thus permit the laws of population and diminishing returns to "lead to the terrible conclusions of Malthus." Collectivism would relieve the individual of responsibility for the support of his family and destroy forethought and reflection which are products of individual responsibility and which both prevent undue growth of population and foster capital accumulation. Accordingly, given collectivism and the resultant consumption of all "surplus value," capital per head and per capita productivity and real wages would fall to very low levels and depress the standard of living in a cumulative, spiral fashion.[50]

A. Cournot, a Malthusian and a Darwinian, apparently supposed that state support of the poor would interfere with natural

[48] Similar arguments were directed against the theory that man had the "droit au travail." Such a right, said Faucher, Thiers, Garnier, Dufaure, and others, presupposed permanent economic stability and, if allowed, would destroy (as would the "right" to relief) both foresight and the spirit of emulation, to which progress and wealth are traceable. See article "Droit au travail" in *Dictionnaire de l'économie politique* (1864), I, 612–17; also Garnier, *Du principe*, pp. 284–309, and L. Villermé (*fils*), *J.d.e.*, 1st ser., XXII (1849), 139–55. G. Schelle (*Du Pont* ... , p. 62) indicates that both the "droit au travail" and Raynal's "droit de vivre" were easily derivable from Quesnay's "le droit naturel de l'homme est le droit que l'homme a de faire ce qui lui est avantageux."

[49] *J.d.e.*, 1st ser., XXV (1850), 134–44; XXVIII (1851), 215–22; XXXV (1853), 133–37, 321–36; article on "Bienfaisance publique" in *Dictionnaire de l'économie politique* (1864); also *Etude sur les causes de la misère tant morale que physique, et sur les moyens d'y porter remède* (Paris, 1853); *Précis de la science économique* (Paris, 1862), I, 446–49; II, 234–35, 239.

[50] *Collectivism* (London, 1891), pp. 52, 62–63, 121–24. This work was first published in Paris in 1890 as *Socialisme, collectivisme et socialisme libéral*. Naquet's arguments resemble those of A. T. Hadley, *Economics* (New York, 1896), pp. 45–51.

selection and have a dysgenic effect. He considered it self-evident that, given a fixed milieu, numbers would be limited either by repressive checks or by human foresight. Systematic poor relief would create a parasitic pauper class which could grow only until a given society with given resources, having reached its capacity to support such a class, would be compelled either to deal violently with the problem or to permit new increments of paupers to perish as would the original paupers had systematic relief never been provided. Cournot feared, moreover, that collectivistic arrangements might frustrate natural selection, lead to the state support of social parasites, and produce dysgenic selection. Inasmuch as the upper classes were recruited from the lower, dysgenic selection would be intensified in proportion as society became surcharged at the bottom with socially sustained incompetents.[51]

Among the leading critics of anti-Malthusianism and the leading defenders of Malthusianism in the latter part of the last century were E. de Laveleye, a Belgian, A. Jourdan, and M. Block.[52] De Laveleye, who was influenced by J. S. Mill, found in the spread of proprietorship "the well attested antidote to the excessive multiplication of our species."[53] Jourdan declared that increasing density of population could promote progress and division of labor only to a limited degree; that longevity was associated with slow growth of population; and that, given prudence and thrift, an increasingly satisfactory balance could be maintained between population and production.[54] The views of Block, a vigorous critic

[51] *Revue sommaire des doctrines économiques* (Paris, 1877), pp. 280–84, 287–89; *Principes de la théorie des richesses* (Paris, 1863), Book IV, chap. i.

[52] Pro-natality arguments were characterized as mercantilistic by writers who emphasized the qualitative composition of the population, or denied that populousness was the main source of power, or asserted that France had enough or too many people. E.g., see G. Broca, articles in *Bulletin de l'académie de médicine*, Vol. XXXII (1866–67); M. Cernushi, *J.d.e.*, 3d ser., V (1867), 322; A. Courtois, *ibid.*, 4th ser., XIV (1881), 168–69, XXXI (1885), 290–91; discussion in *ibid.*, 5th ser., XXIX (1897), 116 ff., 126 ff.; C. de Varigny, *R.d.d.m.*, December 1, 1890, pp. 597–616; also citations in R. Gonnard, *La dépopulation* (Lyon, 1898), p. 88; G. Le Bon, *Revue bleue*, May 1, 1926, p. 263; *Psychologie du socialisme* (Paris, 1898); G. Giroud, *Population et subsistances* (Paris, 1902).

[53] *The Elements of Political Economy* (New York, 1886), pp. 148, 151, 164–68. This is a translation of the 1882 French edition.

[54] *Cours analytique d'économie politique* (Paris, 1890 ed.), pp. 176–85.

of Malthus' critics, resemble those of Jourdan. He saw in continued population growth "a latent crisis," for this growth was sustained by the superfluity of the new world and could no longer be supported when the latter had become filled and industry had ceased to keep pace with population growth. The general effect of population growth was to intensify international competition for foreign markets and foreign sources of food.[55]

R. Lascaux, who was concerned over France's slow demographic growth, said that, although France could support about fifty millions, her actual population was virtually too large for the available means of support, given the prevailing "inconceivable incapacity of the French élite" to manage the French economy rationally and efficiently. He advocated that France increase the supply of capital for domestic use through increased saving and through the prohibition of all exports of capital; that this capital be directed, possibly through the stimulus of state subsidies, into necessity-producing industries and agriculture; that agricultural methods be improved and that larger scale organization of agricultural enterprise be encouraged; that state subventions to weak industries be removed and that free importation of necessities be permitted; that consumption be regulated in such a way as to assure each as much as, and apparently little more than, was warranted by hygenic science; and that the immigration of foreign labor be encouraged. He added that it was useless to encourage natality by subventions to large families, or to try to check mortality by constructing hospitals, etc., for such expenditures but diverted resources from the field of the production of necessities upon whose improvement low mortality and high natality were contingent.[56]

[55] *R.d.d.m.*, October 15, 1882, pp. 911–33; *Annales*, V, 83–84; *Les progrès de la science économique*, I, 527–57; *J.R.S.S.*, XXV (1862), 72–74. In a criticism of Block's views C. Richet said population was the source of national wealth and strength (*R.d.d.m.*, July 1, 1883, pp. 221–26).

[56] *La production et la population* (Paris, 1921), pp. 10, 23, 24, 33–36, 83–87, 198–200, 293, 309–10, 321–24, 330–34. Lascaux held (*ibid.*, pp. 83, 86–87, 198–99) that "existing capital," whose composition at any moment was relatively fixed, "determined" the number of workers who could be employed, thus implying relatively fixed proportions in production of capital and labor. Lascaux's treatment of the dependence of population upon production resembles in some respects that of Effertz and Cauderlier (below, n. 76; also December issue this *Journal*, n. 149).

III. CONDITIONAL MALTHUSIANS

The writers in the preceding section subscribed, as we have seen, to Malthus' conclusion that, since population has a greater inherent capacity to increase than has production, the growth of population must be subjected to volitional control. Most of them supposed, moreover, that conditions conducive to such volitional control could and would evolve. In the succeeding sections we shall examine the views of writers who rejected the substance of Malthus' *Essay* either because they attributed poverty to non-demographic factors or because they believed the factors which determine fertility to be largely independent of the factors which govern economic production. In the present section we shall examine the views of writers who may roughly be classified as conditional Malthusians. These writers, some of whom were alarmed at the decline in French natality and most of whom subscribed to the individualistic philosophy of the liberal school, rejected the pessimistic terror of Malthus' *Essay*. They believed either: that overpopulation, if it ever developed, would not develop until the distant future;[57] or that technological progress, the increasing division of labor which would accompany population growth, and the probable expansion of man's desires and standard of living would diminish population pressure;[58] or that Malthus had ignored, or understated, the allegedly beneficial aspects of population growth.[59]

[57] E.g., A. Ott, *Traité d'économie sociale* (Paris, 1892), Vol. II, secs. 172–75; L. Schöne, *Histoire de la population française* (Paris, 1893), p. 410; A. Rouillet, *J.d.e.*, 3d ser., XLIII (1876), 211–23.

[58] A. M. de Jonnes, *J.d.e.*, 1st ser., I (1842), 161–62, 172, and *Elementos de estadistica* (Madrid, 1857), pp. 164–67, 169; T. Fix, *J.d.e.*, 1st ser., X (1845), 313–41; M. Boutowski, *ibid.*, 1st ser., XXXIV (1853), 450–52; P. Reboud, *Précis d'économie politique* (Paris, 1930), I, 96–102; A. des Cilleuls, *La population* (Paris, 1902); Yves Guyot, *Principles of Social Economy* (London, 1892), pp. 125–27, 129–30, 134, 140–41. Guyot, a supporter of the French neo-Malthusian movement, feared that the allegedly inferior races and classes were outbreeding the allegedly superior races and classes.

[59] E.g., A. Joire, *La population, richesse nationale* (Paris, 1885); also *Entretiens populaires sur l'économie politique* (Paris, 1866?), by J. Martinelli, follower of Bastiat. L. Walras said that, while the social interest demanded population growth, this growth must be preceded by the growth of capital (*R.d.e.p.*, XI [1897], 1032–33). A. Cochut, in part both a critic of Malthus and a follower of Doubleday, described

The optimists, F. Bastiat and his disciples, some of whom were influenced in part by Henry Carey,[60] refused either to entertain fears of overpopulation or to attribute poverty to capitalistic institutions. Bastiat rejected the arguments of the anti-Malthusians, saying that, while increasing density of population might, within limits, augment per capita productivity, production could not be made to keep pace with a too rapidly growing population. Accordingly, if numbers were not voluntarily controlled, the positive checks which operated in the animal and vegetable world would become effective. He advocated, therefore, that man be elevated above the brute level of life in which positive checks are operative; and that social institutions and philanthropy be so organized as to act in accordance with the providential plan, inspire intelligence, reason, morality, and foresight in humanity, particularly in its lower strata, and thus transform "repressive limitation into preventive limitation" (i.e., deferment of marriage and celibacy). Bastiat believed, moreover, that since man is perfectible, his physiologically unlimited multiplicative power could and would be increasingly held in check by an expanding scale of life, by the

> means of existence, ... an ensemble of imperceptible satisfactions [which] vary, and consequently change the limit [i.e., standard of life] sought, according to place, time, race, rank, custom, opinion, and habit.

In resumé, perfectibility, which is the distinctive character of man, being given, the action of competition and the law of limitation being known, the lot of the human race, from the point of view of its terrestrial destinies, seems to us to be able to be resumed thus: (1) elevation of all social strata

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the lack of foresight of the lower classes as providential, in that their increase provided recruits for the army, for painful occupations, and for the relatively infertile upper classes who were not replacing themselves, and prevented population from decreasing (*R.d.d.m.*, April 1, 1846, pp. 37, 40, 47, 53–58, 61–62).

[60] E. L. Villey-Desmeserets (*Principes d'économie politique* [Paris, 1894], pp. 127, 155) and L. Reyboud (*R.d.d.m.*, April 15, 1868, pp. 974–94) approved many of Carey's criticisms of Malthus and emphasized the advantages of population growth. Elsewhere Reyboud, an advocate of European colonization of the world, said that history revealed two demographic tendencies: the growth and spread of population to all parts of the world; the ennoblement of the human species through the replacement of inferior by superior races (*J.d.e.*, 1st ser., I [1842], 191–95; *R.d.d.m.*, April 1, 1855, pp. 140–43).

at one time, or of the general level of humanity; (2) indefinite rapprochement of all grades and successive annihilation of the distances which separate the classes, unto a limit imposed by absolute justice; (3) relative diminution, as to number, of the lowest and the highest social stratum, and extension of intermediary strata. . . . . One will say that these laws must lead to absolute equality. . . . . No more than the eternal rapprochement of right side and of the asymptote must lead to fusion.[61]

Whereas H. Baudrillart, editor of the *Journal des économistes*, was content largely to repeat Bastiat's views, to indicate that natality might become too low, and, following Carey, to note the allegedly beneficial effects of population growth,[62] Bastiat's editor, De Fontenay, rejected Malthus' "historical apology for vice." Extending Bastiat's opinions, De Fontenay in 1853 said that the desire for well-being, which rose as the level of existence rose, would prevent overpopulation and retrogression; that specialization, invention, and civilization progressed with increases in the density of population which was, per se, a "productive force, the primary, most powerful and most indispensable cause of all progress. . . . . In theory as in fact, wherever population increases, the means of existence increase in a much more rapid ratio."[63]

Subsequently, having been converted to Carey's views,[64] he

[61] *Harmonies économiques*, in *Œuvres complètes*, edited by R. de Fontenay (Paris, 1854), chap. xvi, pp. 450, 457, 461–63, 465, 467, 471–72, 477–80, 103; also *J.d.e.*, 1st ser., XV (1846), 233 ff.; note by Fontenay in *Harmonies*, pp. 480–81.

[62] See Baudrillart, *Economie politique populaire* (Paris, 1869), pp. 239, 243, 252–53; *Manuel d'économie politique* (Paris, 1857), pp. 404–30; *Les populations agricoles de la France* (Paris, 1893). In 1862 (*Annales*, V, 97 ff.) he said that if men waited until the age of thirty to marry, a satisfactory equilibrium would be maintained between population and subsistence. He approved the opinion of M. Monjean, who said that whether or not further population growth was desirable depended primarily upon whether or not the new increments of population were of good quality and capable of becoming productive forces. See Monjean's Introduction to the translation of Malthus' *Principles of Political Economy*, in "Collection des principaux économistes," cited by Baudrillart, *Manuel*, p. 426. Elsewhere (*J.d.e.*, 1st ser., X [1845], 84) Monjean said that the workers' lot could be improved through moral instruction, institutions designed to promote thrift, and laissez faire. See also *ibid.*, IV (1843), 420, 429.

[63] *Annales*, I (1846–53), 537–38.

[64] Carey's *Social Science*, of which one chapter appeared in the *J.d.e.*, 2d ser., XXIII (1859), 193–211, was summarized, following its translation into the French by De Fontenay (*ibid.*, 2d. ser., XXXV [1862], 377–94; XXXVI [1862], 5–18) and defended (*ibid.*, 2d ser., XXXVII [1863], 254–65, 449–63). Carey's protectionism was rejected by De Fontenay, however.

contended that population growth, and not production, was limited. For as civilization advanced, man's productive power increased and his procreative power diminished. The possibilities of shifting to better lands, of utilizing chemistry, of developing fish culture, and of adopting machine methods assured ever increasing production. The increasing antithesis between individuation and genesis,[65] coupled with the development of prudence, and the elevation of the standard of living under conditions of liberty, security, confidence, and civilization would check procreation.[66]

Louis Wolowski, H. Passy, and Clement Juglar, while noting that population growth was advantageous only under certain conditions, agreed that man's desire to better himself was checking,

[65] This antithesis, noted by Spencer, Wundt, and Courcelle-Seneuil (see Denis, *Histoire des systèmes*) and, in 1854, by A. Comte (*System of Positive Polity* [London, 1877], IV, 278), and apparently anticipated by Fourier and his followers (see below), was accepted in part by P. Jacoby, A. Fouillée, De Candolle, H. Secrétan, G. Delaunay, E. Maurel, and others. V. Lapouge, who attributed France's low natality to the cross-breeding of specifically or generically different human types (*R.d.e.p.*, IX [1895], 1002–29; X [1896], 132–46), said that the societary circulation, produced by the social capillarity of a plutocratic civilization, would tend to eliminate the "dolicocephals" and the "intellectual aristocracy" (i.e., "all who are not psychically plebeians"). See *Les sélections sociales* (Paris, 1896), pp. 345–46. Recently J. Bourdon charged C. Gini, Italian disciple of Lapouge, who considers the French physiologically infertile, with employing this theory to justify Italian expansion and to undermine the French and Anglo-Saxon endeavor to preserve the status quo (*R.d.e.p.*, XLVII [1933], 1608–9).

Some of the writers mentioned gave attention to the effect of heredity and of inbreeding. In 1863 (see *J.d.e.*, 2d ser., XXXVIII [1863], 110) A. Mangin, in a critical and essentially sound review of the literature on consanguinous unions, stressed the importance of the study of hereditary transmissibility. If "excess of population is an evil," he said, "its degeneration is a yet greater evil."

[66] See preceding note. De Fontenay's views were criticized by De Lavergne (*J.d.e.*, 2d ser., XXXVII [1863], 464–74) and by Cherbuliez (*Annales*, I [1853], 379–84). Carey's views were severely criticized by Dupuit (*J.d.e.*, 2d ser., XXXVII [1863], 237–48, 474–82) and by A. Clément (*ibid.*, 1st ser., XXXIII [1852], 133). See also Carey's reply and further discussion (*ibid.*, 1st ser., XXXIV [1853], 417–31). A continuous controversy over the rent and population doctrines of Carey and the population doctrines of Bastiat filled the pages of the *J.d.e.* See 1st ser., XXX (1851), 140–44, 288–302; XXXI (1852), 81 ff., 98 ff., 186 ff., 196 ff., 456–73; XXXII (1852), 89 ff.; XXXIII (1852), 155 ff.; XXXIV (1853), 420, 446; XXXV (1853), 275–96; XXXVII (1853), 271 ff., 433 ff.; 2d ser., II (1854), 128 ff. On the priority of Carey's views see *ibid.*, XXVII (1860), 136–39. See also Passy and Cherbuliez on rent, *ibid.*, 1st ser., XXXIV (1853), 321 ff.; XXXV (1853), 321 ff.

and would continue to check, population growth adequately. Wolowski, in part a disciple of Roscher, said:

> That which is called moral restraint is only the resultant of these diverse conditions; it manifests itself even in an exhausted milieu; it would be absurd to think of imposing it in an adverse milieu, it is not a mechanism, it is an idea, a sentiment. . . . . The character of restraint will disappear in order to make place for the free act of an intelligent will, and the problem of population will be settled.[67]

H. Passy observed that the penchant to multiply could be, and was being, held in check. There is

> a permanent conflict between the sensual appetites and reason which counsels that they be satisfied only with measure and prudence. . . . . Reason restrains the activity of the principle of population within limits which, in diverse epochs of civilization, have allowed wealth to increase more rapidly than the men called forth to share it.[68]
>
> Malthus, in transforming into a general law, constantly active, a simple possibility of promotion, does not remember sufficiently that man, in the course that he allows his appetites, obeys diverse motives, ... among which there are some which, according to time and place, acquire a restrictive power perhaps excessive.[69]

Clement Juglar, a physician who accepted the "safe-period" doctrine, stressed the effect of crises on natality and mortality, saw in the disinclination of the French to emigrate an evidence of well-being, and characterized "moral restraint" as a feasible preventive check. For "there are only ten to twelve days [per month] during which a woman is apt to conceive. . . . . Moral and physical restraint thus find themselves combined to achieve the same end."[70] In 1886, M. Rouxel, who believed that misery was trace-

[67] *Etudes de l'économie politique* (Paris, 1848), p. 3. See also *Annales*, V (1862–64), 80–83, 150–54; I (1846–53), 389. Prudence was counseled by Wolowski and Fonteyraud in *Instructions sur l'économie politique* (Paris, 1849).

[68] *Annales*, V (1862–64), 124, 129.

[69] *J.d.e.*, 2d ser., V (1867), 313–15; also *ibid.*, 1st ser., XX (1848), 306, 308; XIV (1846), p. 393; *Annales*, V (1862–64), 124–30; X (1873–74), 41 ff. Louis Passy attributed the decline in Norman natality to the fact that the Normans, seeing the possibility of achieving some wealth, a possibility not open to the urban working class, restricted their numbers to achieve this possibility (*J.d.e.*, 2d ser., XXXVI [1862], 425–27).

[70] *Annales*, V (1862–64), 122. See also *J.d.e.*, 1st ser., XXX (1851), 367–80; XXXVI (1853), 233; 2d ser., XIV (1857), 260–65; 3d ser., XV (1869), 131–32;

able less to population pressure than to indolence and unproductive use of labor, advanced Loudon's[71] triennial lactation as a sufficient solution of the population problem:

> Population is regulated by two laws, physiological and hence natural: (1) a *law of impulsion*, the tendency to procreate which, carried into action, is called copulation, and its consequences; (2) the *law of limitation*, the function of lactation. Through conforming to these two laws, overpopulation is impossible and one enjoys, women above all, most perfect happiness.[72]

Guillard, the father of demography, tried to show on a priori and experimental grounds that "the mean population proportions itself to the disposable subsistences"; that the movements of population and subsistence are indissolubly connected, population increasing or diminishing as subsistence increases or diminishes; that consequently population cannot permanently outstrip subsistence and create lasting misery.[73] Guillard attributed vice and

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Séances et travaux de l'académie des sciences morales et politiques (1903, 2e semestre), pp. 211–20. Juglar based his advocacy of the safe period upon F. A. Pouchet's *Théorie positive de l'ovulation spontanée* (Paris, 1847). Pouchet, who had developed his theory as early as 1842 (*Théorie positive de la fécondation des mammifères* [Paris, 1842], believed conception could occur only during the eight to ten days which follow the menses. Both De Molinari (*Annales*, V [1862–64], 123) and A. Mangin (*J.d.e.*, 2d ser., XXXVIII [1863], 110) approved the "safe-period" method.

[71] In his *Solution du problème de la population et de la subsistance* (Paris, 1842), Charles Loudon, an English physician, advocated triennial lactation as the only natural and health-conserving means of regulating population growth. This practice, he said, would permit marriage at the proper age, eighteen to twenty years, and yet limit the number of births per family to about four.

[72] *J.d.e.*, 4th ser., XXXIII (1886), 428, also pp. 419, 425–29. Rouxel considered prolonged sexual abstinence as harmful, but objected to Drysdale's "preventive" copulation. Lactation, said Rouxel, added to the mother's health and pleasure. Rouxel said that Loudon's solution had been defended only by E. de Girardin, who had criticized Malthus for supposing that the greatest possible rate of natural increase was also the normal rate. Rouxel quotes extensively from C. Drysdale, *Eléments de la science sociale* (Paris, 1885), and from H. Thulie, *La femme* (Paris, 1885). Elsewhere E. de Girardin (see *La liberté dans le marriage* [Paris, 1859], pp. 43–44, 71), who attributed to Destutt de Tracy the observation that men seek to seduce as many women as possible, advocated the abolition of illegitimacy, the universalization of a marriage settlement on all women, and the provision of aid for needy mothers and abandoned children.

[73] *Eléments de statistique humaine* (Paris, 1855), pp. 55–56, 80–108, 350–68; *J.d.e.*, 1st ser., XXXVI (1853), 184–93, 459–60. In 1877 L. A. Bertillon reformu-

misery to ignorance, advocated that the government concern itself with the intellectual and moral state of the population, and suggested that social dissatisfaction could be avoided if increases in the national income were employed to ameliorate the condition of the masses.[74] Legoyt, critic of Le Play and Doubleday, who was later to express concern over the decline of French natality, at first considered this decline to be an index of progress. He stated that France was a mature "grown-up country, ... an organism arrived at the plenitude of its development"; that the government could foster natural increase by improving hygienic conditions and by eliminating obstacles to marriage; that actual depopulation would never develop, inasmuch as progress in wealth required human hands to operate the natural agents and the capital equipment.[75]

The eminent French demographer and economist, E. Levasseur, while admitting that a population has a natural tendency to increase which is conditioned by the total needs of that population and by its economic capacity to produce, believed that experience had proved Malthus' ratios erroneous and had indicated that production had outstripped and would, with the aid of science,

lated Guillard's proposition as follows: "In a healthy country, inhabited by a given race at a given stage of mental development, the population, and consequently the number of births, tends to be proportionate to the quantity of productive labour of which that race at that stage of development is most easily susceptible." See G. Cauderlier (*Les lois de la population et leur application à la Belgique* [Paris, 1899], pp. 163, 164–75), who rejected Bertillon's formula as Du Puynode earlier rejected Guillard's.

[74] *Eléments*, pp. 95, 114–15, 132–33. He attributed the decline in natality to the operation of a not yet understood beneficent natural law (*J.d.e.*, 1st ser., XXXVI [1853], 188).

[75] *J.d.e.*, 3d ser., VI (1867), 356–73; VII (1867), 205–28; *ibid.*, 1st ser., XVII (1847), 174–76, 190. Among the checks to natality he enumerated progress in wealth, comfort, and ambition; conscription; prostitution; religious celibacy; rising cost of living; increased age at marriage; mercenary wet nursing; uncertainty caused by revolutions. He treated both internal and international migration as a movement of population from relatively lower to relatively higher economic levels. See *J.d.e.*, 2d ser., XXXI (1861), 265; *Du progrès des agglomérations urbaines et de l'émigration rurale* (Marseille, 1870). While some accepted this analysis of migration (e.g., *J.d.e.*, 3d ser., VII [1867], 342–44), others emphasized also the influence of railroads, conscription, and governmental expenditures upon internal migration (e.g., *ibid.*, 3d ser., VIII [1867], 90–99).

continue to outstrip numbers.[76] Although experience indicated no rigid relationship between the respective movements of numbers and production, it did support certain propositions. Population is limited by subsistence acquired through domestic production or through international exchange, the actual number being determined, other things equal, by the level of average individual consumption. The density of population on a given territory is determined principally, other things equal, by the climatic and productive advantages of that territory, by the relative amount of capital available, by the degree of advance in science and industrial arts, by the intelligence and industry of the population, and by the degree of efficiency in social organization and government. Population will be more dense if the nation, or stage of exploitation, requires many (e.g., vineyards) rather than few hands (e.g., grazing). Population grows less rapidly than substance in new countries with abundant land supplies. The rate of growth of population in old countries, where agriculture is subject to increasing costs, is governed by the extent of international markets which permit the exchange of manufactures for food products. The average level of well-being can rise only when production outstrips population, which, in turn, grows in inverse relation to the level

[76] *La population française* (3 vols.; Paris, 1889–92), III, 15, 111–13; *Elements of Political Economy* (New York, 1905), p. 147. Levasseur criticized the work of the Belgian, G. Cauderlier, a critic of Dumont, Leroy-Beaulieu, and A. and J. Bertillon. Cauderlier contended that nuptiality, natality, net immigration, and hence population in general are fixed by "the resources that the population draws from its work, or from the work of anterior generations" and by "the average value of the needs of life to which these resources must give satisfaction." He concluded, therefore, that whatever tended to diminish the former (e.g., urbanization, alcoholic consumption, taxes, tariffs) or to augment the latter (e.g., alcoholic consumption, civilization) would check population growth, and that whatever had the opposite effects would foster population growth; the pro-natality measures would be efficacious in proportion as they increased production or decreased needs. See Cauderlier, *Les lois de la population ... à la Belgique* (Paris, 1899), pp. 233–40, and *Les lois de la population en France* (Paris, 1902), pp. 3–21, 116. In an Introduction to the latter work Levasseur criticized (pp. x–xix) Cauderlier's formula, $\text{Population} = \frac{\text{Resources}}{\text{Needs}}$, saying that "needs" were indefinitely extensible; that a growth of wealth engendered needs as well as numbers; that a decline in natality did not necessarily indicate a decline in wealth; that the "human will" both determined and was influenced by "needs"; that urbanization was necessary to absorb the unemployed of rural areas; that Cauderlier's theory was not wholly contrary to Dumont's.

of average consumption in various countries.[77] Average consumption tends to rise as the level of wages (which is determined principally by the productivity of labor) rises, the newly acquired scale of living enabling the laborer to resist wage reductions and to maintain his income "at the point required by his mode of living."[78] Internal and international migration carries population from areas where economic and social conditions are less desirable to areas where they are more desirable, and thus benefits both areas of immigration and emigration and humanity in general. He predicted that migration would decline as national natality and wage levels approached parity and as barriers to immigration were set up (as he predicted they would be) by countries whose period of expansion had been completed.[79]

[77] *La population*, III, 24–28.

[78] *The American Workman*, pp. 369, 380, 389–90. In general French writers have not carefully analyzed the social processes which govern the standard of living, or the relation of the standard of living to population growth. In a recent work devoted in part to the dynamic aspect of the family budget of workers, M. Halbwachs states that workers begin the consumption of new types of goods and expand the consumption of goods theretofore consumed in relatively small quantities during periods when expanding wage levels are placing in the hands of workers greater sums of purchasing power than are required to satisfy their usual or quasi-customary wants. During periods when real wages cease to rise, or decline, or when the prices of customarily consumed goods rise noticeably, families (particularly of the working class) rearrange the pattern of their household budgets, or living standards. They economize on customarily consumed goods whose prices rise appreciably, but not on goods which, in the past, have been relatively irregularly consumed; they cling to the newly acquired tastes at the expense of tastes hitherto dominant in the scale or standard of living. Thus the relative importance of specific items in the standard changes, new "necessities" in part displacing older "necessities." Halbwachs states that, while no one item in a worker's budget or standard is immune to contraction, the ensemble of items—itself a growing thing in periods of expansion—effectively resists contraction. He suggests, therefore, in a discussion of the "natural wage" of Ricardo and Turgot, that wages are governed by "the intensity and diversity of wants, in a given class at a given moment. They adapt themselves necessarily, in the long run, to the habits of consumption and the expenditures of the workers." See *L'évolution des besoins dans les classes ouvrières* (Paris, 1933), p. 137, also pp. 128–31, 133–51. For a critical summary of all the so-called laws of consumption see C. C. Zimmerman, *American Journal of Sociology*, XLI (1935), 13–30. Halbwachs ignores the determinants of productivity, the major relations of the level of productivity to the level of standards of living, and the relation between living standards and family size or the long run supply of labor.

[79] *American Workman*, pp. 445, 495–97; *J.R.S.S.*, XLVIII (1885), 65; *La population*, III, 26–27.

While Levasseur believed that France's relative military strength would be threatened for some time by the relatively more rapid population growth of other countries, he predicted that natality would fall in other countries until their populations had become comparatively as stationary as that of France. He denied, however, that France would be depeopled or would waste away, and asserted that her culture would maintain her international prestige even though her numbers became stationary. He had little faith in the efficacy of the proposed pronatality measures, which he considered to be contrary to the principles of liberty and property and to involve the complete subjection of the individual to the state.[80] He characterized Mill's stationary state as historically nonexistent and undesirable, saying that so long as the increase of wealth could be made to parallel that of population, some population growth was necessary to stimulate man and to prevent stagnation. A birth-rate of 25 per 1,000, coupled with a reduction in mortality, would permit the necessary population increase in France. He did not indicate how such a natality level could be secured, however, remaining content to explain the decline in natality primarily in terms of an expanding standard of living and to reject various other explanations.[81] He believed, too, that Malthus' counsel of moral restraint ought to be heeded by the lower ranks of society, and that indiscriminate charity encouraged laziness and vice.[82]

Malthus' views were criticized by P. Cauwés, who was influenced by writers such as Henry George and who, like Gide,[83] did not subscribe fully to the liberal opposition to state intervention-

[80] In reply to J. Bertillon's proposal that military and tax and other social burdens be transferred from those with three or more children to those with fewer or no children (*R.p.e.p.*, June, 1897, pp. 531–74), Levasseur said (*ibid.*, October, 1897, p. 29): "One of [the state's] principal functions is to assure the exercise of individual liberty and of the right of property, which are in general developed and consolidated with civilization, and which are fundamental conditions of dignity, of expansion, and of well-being for individuals, and of prosperity for the state."

[81] *La population*, III, 26–27, 161–84, 194–96, 215, 226, 256–59, 486, 494–96; *R.p.e.p.*, October, 1897, pp. 1–29.

[82] *Elements*, p. 158.

[83] See *R.d.e.p.*, XLV (1931), 1347–57, for Gide's early reaction to the French liberal school.

ism. History, Cauwés stated, revealed no secular increase in population pressure. Population growth fostered the division of labor, the development of skill and education, the reduction of transportation costs. Population, wealth, and well-being progressed together. International commerce freed given countries of dependence upon their own food supplies. Emigration can relieve overpopulation. In general Cauwés emphasized the rôle of the "will" of man, saying that education would both augment man's productivity and lead him not to procreate children he could not support. Cauwés asserted that the state could intervene to insure desired population trends, and rejected De Molinari's suggestion that the costs of child reproduction and rearing should always fall immediately upon the parent, the latter to be reimbursed by the child.[84]

C. Colson's opinions resembled those of Cauwés. Colson stated that so long as population growth promoted the division of labor, the use of improved industrial processes, and decreases in the relative importance of transportation costs, per capita productivity and the level of wages would rise. When, however, the density of population was such as to permit maximum economic efficiency, further population growth, if unaccompanied by improvements in the state of the arts, would depress per capita productivity and wage levels; for the ratio of the working population to capital, disposable natural agents, and auxiliary means of production would rise. Moreover, the resultant rise in the interest rate would divert a larger proportion of the total output from the workers to the capitalists. Although Colson considered some countries (e.g., Belgium) overpopulated, he characterized the French rate of population growth as too low to yield the alleged non-economic advantages of population growth. He described as the ideal national demographic situation one in which mortality was low, the rate of natural increase was appreciable but less than the rate of capital

[84] *Cours d'économie politique* (3d ed.; Paris, 1893), II, 9–32, 44–46, 64–69. The views of P. Beauregard (*Eléments d'économie politique* [Paris, 1889], pp. 148–52, 181–87) and of R. Foignet (*Manuel élémentaire d'économie politique* [Paris, 1903], pp. 184–89), both of whom admitted the necessity of maintaining a balance between numbers and production and stressed the advantage of some population growth, resemble in part those of Cauwés.

accumulation and technological progress, and the rate of national population growth was adequate to prevent torpor, to stimulate enterprise, to extend a country's military and cultural and political power, to permit some emigration, to allow wages to rise and to enable the worker (whose lot depended principally upon his own efforts) to improve his condition.[85]

[85] Colson in 1915 (*see R.d.d.m.*, April 15, 1915, pp. 840–75) proposed a set of pronatality measures, designed to shift some of the costs of natural increase to the less fertile, to check neo-Malthusianism, and to create a psychological attitude favorable to natality. Earlier he had stated that the state could not afford to reward parents of large families; that natality, whose fall had been caused by the progress of civilization and the expansion of the standard of living, could be raised only by changing "customs and ideas . . . . rather than laws." He had advocated the encouragement of immigration, saying that in the absence of immigration the declining interest rate would cause French capital to flow abroad. See *Cours d'économie politique* (Paris, 1901), II, 7–11, 15–16, 28–30, 39–40, 49–51.

[*To be continued*]

THE QUANTITY OF CAPITAL AND THE RATE OF INTEREST. II

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TO ANALYZE the problem of capital and interest we have to begin by accepting the reality and conceptual separateness of two processes which cannot be sharply distinguished objectively. The first is the maximizing of return from a given total investment in an economic system, whether that of a Crusoe or of an organized or social economy, by moving investment or "capital" from one field to another. The second process is increase of return through further investment. In Part I of this essay[26] we have attempted to sketch the analysis for a system in which abstraction is made from the second process. But this does not mean that we have presented in detail the first process—the establishment of an equilibrium maximizing the return from a given total investment beginning with a system in some other condition than that of equilibrium and, holding other things equal, including the quantity of capital, while the capital is shifted about between different modes of investment. In this sense the treatment is unsatisfactory, but the embarrassing fact is that the readjustment in question could not be experimentally carried out or traced. It would be impossible for Crusoe, or the board of economic control in a collectivist economy, or the statistical analyst in a competitive economy, to know that a quantity of investment was being maintained exactly constant while it was being shifted from one use to another. This seems to hold even if the transfer does not involve a change in the form of the investment, but only a movement of the same concrete capital goods from one field or one mode of employment to another, and it is true *a fortiori* if change in form is involved.

It is, however, both possible and necessary for analytical pur-

[26] *Journal of Political Economy*, August, 1936.

poses to imagine a society in equilibrium in the first sense, but not in the second, i.e., one in which the economic interests of the individual Crusoe or the net economic interests of the plural membership prompt further investment, but where in the absence of further investment no increase in return would be achieved by any transfer of existing investment. And in such a society it is possible, and analytically necessary, to imagine further investment directed in such a way as to secure the maximum return from each successive new infinitesimal increment of investment (made at any time rate over an infinitesimal interval). This is the situation actually dealt with in the analysis of Part I. That is, we have attempted to develop a theory of capital quantity and the interest rate with reference to conditions at a given moment in a society in such a process of growth.[27]

The task of this second part of the study is to investigate the process of growth in investment, with especial reference to the question whether such growth tends toward equilibrium under any tenable and useful set of *ceteris paribus* assumptions. This problem, of course, includes, or practically is an aspect of, the question of an equilibrium rate of interest in the meaning which the expression commonly has in the literature of economic theory. The appropriate method of procedure seems to be to take up the theory of interest under the form of price analysis in terms of supply and demand.

Two facts especially lead to confusion in the treatment of interest as a price problem, or specifically as the price of a productive service. The first, which calls for only brief mention here, is the peculiarity that the productive agency which renders the service is treated as a value magnitude, being expressed in terms of money, so that the price becomes a ratio as well as a time rate of payment; it is a percentage per annum. In consequence of this homogeneity either term of the ratio may be taken as the commodity, and the other as the price. It is usual to think of the interest as the price of the year's use of a unit quantity of capital,

[27] The possible historical beginning of such a process has not been investigated, and the writer gravely doubts whether such an investigation could be meaningully carried out.

as just suggested; but it is also possible to think of the quantity of capital as the price of a stream of service to be rendered, and this is, in fact, the most common definition of capital.[28] It is also fairly common—more so in England than in the United States—to express the capital value as a ratio to the net annual value of the service—the perpetuity, i.e., to express it as a number of years' purchase. Most commonly the capital magnitude appears as the value of some real source of service, the latter being measured in money and expressed in value (price) terms as "income." Income as a magnitude has the dimension of intensity; it may also have that of time, or it may be inherently perpetual.[29]

EQUILIBRIUM PRICE THEORY INAPPLICABLE. CAPITAL AN ACCUMULATING GOOD

The second, and more important, source of confusion is the fact that ordinary or normal-equilibrium price analysis has no application to a situation of the type presented by the capital market. This is the main question which now has to be argued. The reason, in brief, is that in the only world of which we have any knowledge as a basis for discussing interest theory, or with respect to which we have any serious reason for doing so, the total investment of capital is always increasing, and rather rapidly, when the markets and economic relations generally are not disorganized by depression conditions. In this connection it is necessary to keep in mind that the theory of equilibrium price is ordinarily developed to fit the case of a consumption good such as wheat or sugar. Regarding the value or price of such a commodity two facts are important for the present argument. The first is that in reality all commodity value is capital value and, if accurately expressed, represents the discounted value of a service. In the case of a perishable consumption good the service life is assumed

[28] As pointed out at the outset of this study (in Part I), this circularity is one of the main logical difficulties in the capital-and-interest relation.

[29] If limited in time, an income may be evaluated by discounting either as a given intensity for the period of its duration or as a reduced intensity after conversion into a perpetuity. The ordinary notion of capital and interest involves maintenance of the principal (and the yield) indefinitely, since the yield of a time limited return from a money sum or a real source of income is only what is left after provision for maintenance over whatever period is involved.

to be so short that the influence of interest on the value is negligible, and the value of the thing which renders the service is treated as identical with the aggregate (undiscounted) value of the service itself.[30]

The equilibrium price of a consumption good or service is a hypothetical price which would stabilize the permanent, uniform rate of flow of the commodity or service from production into the market and from the market into consumption, and make the two rates equal under the fundamental given conditions of economic life in the system in question at the moment for which the equilibrium price is determined. The theory assumes—whether rightly or not is not in question here—that, if these given conditions were maintained unchanged, the equilibrium price would be established through some course of individualistic readjustment, however prolonged. Where the price in question pertains to a commodity and not a service (personal service or service of any agency whatever), the supply in the market at equilibrium under the most idealized conditions is zero, and in any case it is necessarily constant, if ideal conditions are somewhat more loosely defined.[31]

Normal-price reasoning makes no pretense of explaining the actual price, or the price which would obtain at any moment during the interval in which the economic system was in the process of readjustment toward general equilibrium; it relates only to the price after the establishment of equilibrium. Such price theory, as applied to commodities, is relevant only to situations real, approximately real, or explicitly postulated, in which the commodity actually flows into the market at a rate approximately the same as

[30] In an analytical treatment of value relations it would be more realistic to regard such goods as carriers of the services of more durable agencies, and the value of a unit as the value of a quantity of such services, an integral of intensity over time, properly discounted.

[31] Commodities whose supply is intermittent or fluctuating, such as farm crops, form no real exception. They have no normal price except over periods long enough to get away from the seasonal or other fluctuations. Accurately speaking, the commodity is not identical at different points in the season, its changes in time utility and other utilities corresponding to price changes during the season. Normal price over a period of years should be taken with reference to corresponding points in each annual (or other) cycle.

that at which it is consumed. It is not applicable to a commodity of which there is a stock which "normally" grows (or declines) without a definite prospect of coming to a stationary level, but only to cases where the stocks and the supply and the price do fluctuate within reasonably narrow limits and fairly short time intervals around (on both sides of) an equilibrium point. (Or where they would do so in the absence of long-run changes in the given conditions, from which changes abstraction is expressly made in formulating the theory.) A fluctuating stock of the commodity serves as a buffer, smoothing out fluctuations in price and consumption which would arise from unpredicted or uncontrollable fluctuations in production—or reciprocally for production in relation to fluctuations in consumption.

Price theory as applied expressly to services is unfortunately a neglected theme of economic analysis. It was one of the fundamental errors of the early classical economists, and a precedent still largely followed, to think of economic activity as the production and consumption of things or wealth and, specifically, commodities typified by food. In reality consumption, in a continuing economic life, is exclusively a consumption of services. Any net consumption of things means depletion of the agency sources of services, or, in ordinary language, comes out of capital. Such consumption is, of course, narrowly self-limiting in time; and, as already remarked, economic theory has not been, and has had little ground for being, concerned with decadent systems.[32]

A constant rate of flow of any service into the market ordinarily implies a constant stock of the agency rendering the service. Only the consumption of services of sources which are fully maintained (including in maintenance any replacements which may actually be involved) represents production; any excess comes out of stock. On the other hand, in a progressive society production includes all activities resulting in a net increase in the total stock of sources of services (as well as those involved in

[32] It is, in fact, doubtful whether an enterprise economy could exist and function in accord with analytical theory unless it is rather rapidly progressive; in any case, the theory of economic retrogression should be clearly formulated on the basis of an explicit statement of its special premises.

rendering current services), and there is no consumption corresponding to such production.

Extant discussion of the pricing of services is practically limited to the field of what is called "distribution" theory. It deals in general, and correctly enough, with prices of the services (the rents) of concrete sources assumed to be fully maintained. The great misfortune in dealing with sources in the aggregate (the interest problem), as we shall see, is that theorists assume a constant supply of capital or one which can be described in terms of a tendency toward an equilibrium, parallel in meaning to that assumed to be relevant for the discussion of the price of wheat or sugar. It would be highly desirable for treatises on economics to include also discussion of the price of services of concrete sources where the supply undergoes progressive change, as well as the prices of the sources themselves in such cases, all under given conditions, carefully formulated. This would be the content of a theory of economic dynamics as the term ought to be used; changes in given conditions, not explicable in relation to more remote conditions taken as given, are historical changes, and call for a special methodology.

In developing interest theory in accord with the view that capital service is the thing priced and the interest rate its price, it must imperatively be kept in mind that capital is an "accumulating good." And, in addition, treatment of it as a good at all involves great difficulties because of its heterogeneity and constant changes in concrete form. When it is treated as an accumulating good, the main question for price theory is whether, and under what conditions if at all, it can be expected to stop accumulating, i.e., to reach an equilibrium level of supply.[33] The only

[33] Abstract capital is by no means the only example, or the only important example, of an accumulating good. The category applies more or less to many concrete forms of wealth—all of which are, of course, species of capital. An especially interesting case is that of gold, considered as the monetary commodity, though gold also has commercial and industrial uses in which it has more or less the characteristic of a good produced for consumption. In discussions of the value of money the main assumption of equilibrium analysis—namely, that value is currently determined by cost of production—has been applied almost as uncritically as in the case of interest theory. Ricardo's monetary theory offers an especially egregious example. The fact is, of course, clearly the other way; at any given time the value

condition which is normal in a realistic sense is one in which current production considerably exceeds consumption, and in which there is a net production which is added to the existing supply accumulated from all past time. In the analysis of capital the natural and correct procedure is to treat production as including only net additions to supply. The usable categories are maintenance and growth (if we do not consider decadent economic systems). The process of capital production, or saving and investment, in ordinary usage is regularly taken in the sense of net growth, above maintenance. Thus loans for consumption purposes need not be considered in the general analysis of capital supply and demand for a system. Their only significance is in reducing net saving and slowing up the growth of capital.[34]

The fact of net growth under normal conditions proves that equilibrium in the sense of stable supply and price always corresponds to a lower price and a larger supply than is actually existent or forthcoming. If the market can legitimately be said to be moving toward a position of equilibrium, that position always lies in the future in time. We shall argue that it is not only indefinitely remote, but that there is no presumption of a tendency to establish equilibrium at all.

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of gold sets the margin of production, and the price determines the rate of growth in the supply. Jewelry and art works are more nearly representative of the pure type of accumulating good. But iron and the more permanent building materials partake of this character in a considerable degree. Short of the general decadence of civilization, scientific knowledge would be the purest example but for the fact that the difficulty of maintaining exclusive possession sets limits to the degree to which it is an economic good at all.

[34] If the replacement fund is included in the supply of capital, replacements must be included in the demand, and the two cancel out (the same applies to all maintenance). And this reasoning holds regardless of the relative size of either inclusive maintenance or replacements, in comparison with growth. If there is growth, the conditions of growth effectively determine the interest rate. Such statements must always be understood as subject to the proviso of *ceteris paribus*, and the context must show what other things are included in the proviso. In this case the argument is enormously strengthened by the fact, to be emphasized as we proceed, that the elasticity of demand for capital for the purpose of growth is enormously high, so that only after a considerable lapse of time can a change in the rate of growth of supply make an appreciable difference in the interest rate in comparison with what it would have been. The level of the water in the ocean determines the level in the bay; and only in a very different sense if at all does the rate of flow of water into a tank determine the level in the tank.

Whatever the ultimate tendency may be, the only price analysis which has relevance to actual or visibly prospective conditions is, therefore, of the short-run type. In all such analysis supply at a moment is simply "what it is" at the moment in question. It is a datum, a constant, and not a function of price. It is, to be sure, continuously changing; but that fact raises the problem (*a*) of the equilibrium toward which it may be moving and (*b*) of the rate of change. (The latter, again, is a problem in economic dynamics as the term should be used, referring to change under conditions assumed to be given and unchanging.) With reference to the momentary situation, supply and demand curves cannot be drawn in terms either of rates of flow of capital service or of quantity of capital. Such curves have meaning only at equilibrium in the sense of stationary rate of flow or of supply in existence. Where supply is increasing, the only equilibrium which has meaning is one which corresponds to a supply which is fixed, the equilibrium being a matter of the allocation of a given supply among the alternatives of use open.[35] The only supply change dependent upon price at a moment in the case of an accumulating good is a change in the rate of growth of the supply, or, speaking in terms of its service, a rate of growth in the rate (intensity) of flow. Putting it the other way around, a demand curve in the same dimensions as the type of supply curve just considered (curve of rate of growth in supply), is invalid if not meaningless.[36]

MOMENTARY SITUATION AS REPRESENTED BY SUPPLY AND DEMAND CURVES

The argument may perhaps be made more intelligible by development in connection with Figure 1. Since the essential fact is that we are concerned with the momentary situation and that

[35] And other idealizing assumptions as indicated in Part I. It must be kept in mind that we are abstracting entirely from the effects of uncertainty and in particular from the uncertainty of the future value of money, and all cyclical phenomena. A reservation on this point will be taken up presently.

[36] It is true that a supply curve of this latter type has intelligible meaning and may (as far as the present argument is concerned) have theoretical and practical significance; that question will be raised later, and its consideration will dispose of changes in the rate due to changes in the flow of money funds. In any case a curve showing rate of growth must not be confused with an equilibrium supply curve in the usual sense.

the interest rate at a moment reflects the marginal potential demand price for the supply of capital existing at that moment, we must center attention on the demand curve; and it is also best to consider the quantity of capital as the independent variable and to measure it along the x or horizontal axis. The ordinates then measure interest rates viewed as demand price (and possibly supply price) as a function of capital quantity. We assume for the moment that we know the meaning of the abscissas of the

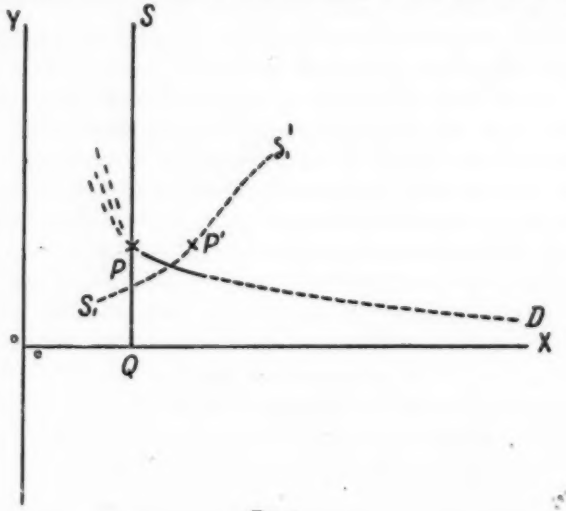

FIG. 1

curve, i.e., have some measure of increasing quantities of capital invested. (This is, in fact, one of the most serious difficulties to be dealt with; it will be discussed later.)

The demand curve should be drawn and discussed in two parts, proceeding in opposite directions from some point, P, chosen to represent the quantity of capital and the demand price (interest rate) under the given conditions in some hypothetical capital market at some particular date, but assuming also that the situation is in equilibrium in the sense that the capital has been so invested as, in the absence of further accumulation, to leave no incentive to make any change. This point may be referred to as the "starting-point," or as "here and now." The curve descends

toward the right, showing decreasing potential yield or productivity of further investment in the given situation—unchanged except for the progressive using up of the better investment opportunities. The rate of return at which any specified quantity of capital can be employed depends on all the conditions in an economic system. Other things being equal, it unquestionably tends to decrease as more and more investment is made; i.e., investment is subject to diminishing returns.

Only this section of the curve, showing the tendency of interest to fall as investment increases under given conditions, has meaning in any approximately quantitative sense. The curve may indeed be continued upward and to the left from P, indicating that the productivity of capital and its demand price would undoubtedly increase if the economy should begin progressively to disinvest under any reasonable interpretation of "other things equal." But the question as to how much the return would increase for a given amount of disinvestment, or even of the measurement of the decreasing total investment, is indefinitely more speculative than for the corresponding changes in the direction of growth. The idea of disinvestment under otherwise unchanging conditions is doubtfully meaningful; there seem to be no grounds for making any particular assumptions as to what the given conditions might be like. It is clearly inadmissible to assume that the process of investment would be reversible over any considerable segment of the demand curve, or that capital originally invested could be recovered without loss, unless the investment had been originally planned for disinvestment. And it would have had to be centrally planned and executed for the economy as a whole and for the entire growth increment to be disinvested under exact anticipation of all the conditions of both the future growth and the subsequent decline.

In the diagram as drawn, a heavy line is used for the demand curve for a certain distance downward and to the right, beyond which it is dotted to emphasize the unreality of the assumption of conditions remaining unchanged while investment proceeds. Upward and to the left, the heavy line extends for a negligible distance, and then is broken into a number of dotted curves, to emphasize the guesswork character of its shape. Even with respect

to progressive increase in investment, the hypothesis of unchanging conditions as regards the things which affect the demand for capital is historically fanciful. But a stationary curve is not mechanically impossible, and relative stability over a moderate interval of growth is a legitimate assumption for analytical purposes, while there is little basis for speculation as to conditions in a decadent economy. We must keep in mind the very long time, in terms of human life and the speed of historical processes, which would be required to increase total investment (or decrease the rate of return—see below) by even a large fraction (to say nothing of a considerable multiple) of its magnitude in, say, the United States in 1936. The magnitude of probable changes in the given conditions is correspondingly large, and it is also undeniable that the increase of investment will, itself, act as a cause in the historical sense (which is not that of quasi-mechanics of price theory) in bringing about various changes affecting the position of the curve.

Yet it is legitimate as a first approximation to picture investment as proceeding along a given demand curve, corresponding to an initial investment situation, and we can be certain as to the general shape of the curve. The quantity of capital which could be employed at hypothetically decreasing rates would unquestionably increase very rapidly in comparison with the amount of net investment (addition made to total investment) which actually occurs under known conditions in a time interval such as a year or five years. Or, stating it the other way around, the interest rate would decline slowly in time. The new saving of any time interval, in terms of which men currently reckon, is a fairly small fraction of the total previous accumulation to which it is added, and effects a relatively small change.

There is, to be sure, no way of giving a definite quantitative meaning to the terms "rapidly" and "slowly" in the preceding paragraph, but the general order of magnitude of the concepts may be indicated with sufficient accuracy for our purposes by the following reasoning. Under perfectly competitive conditions, the general productive function must be homogeneous and linear, and there is no reason to doubt that the simplest function of this type

fits the facts well enough for analytical purposes. That is, letting C stand for capital, F for all complementary factors, and P for production (in value units), we may write

$$P = C^{a}F^{1-a}.$$

The well-known investigations of C. W. Cobb and P. H. Douglas purport to show that $a = \frac{1}{4}$, approximately (cf. *American Economic Review Supplement*, 1928, pp. 185 ff.; also J. M. Clark, *Am. Econ. Rev.*, 1928, pp. 449 ff.). The argument is open to question at a number of points, but quantitative accuracy is not in question here. In such an expression it is easy to show that the elasticity of the demand for the service of either factor is the reciprocal of the exponent of the other, and, since the sum of the exponents must equal unity, the elasticity of demand for capital must be greater than unity. The greater the elasticity, the stronger the case for the position taken here, so it is conservative to assume an elasticity of unity for the demand for capital service. On this assumption, doubling the total investment would always reduce the rate of interest to one-half its level before the doubling. The best estimates indicate that the total amount of capital (total wealth) in the United States is of the order of five times the annual income, and that of the annual income a fifth is a high figure for the fraction which is saved under normal conditions. Thus it would require twenty-five years to double the total investment; and, if other things remained equal, we could expect the interest rate to descend in accord with this logarithmic relation, being at any time equal to half its value twenty-five years earlier in time, and double what it would be twenty-five years later.

In particular it is certain, a priori, that with other things held constant—meaning, especially, if there are no new inventions or other changes opening up new demand for capital—the rate could *never* fall to zero. This is possible only if society as a whole approaches a state of complete satiation in which there would be no economic values and all economic categories would lose meaning. For it is certainly inadmissible to assume that society could reach a state in which no additional capital could be employed to any

advantage whatever, before all other factors or their services became free goods.[37]

[37] I have more than once been confronted with the assertion that this is, prima facie, an improbable statement, and asked to argue or even to prove it. This seems to me a legitimate challenge only in the sense that the contrary statement has been made by recognized economists, notably Professor Schumpeter and Professor Keynes. The real burden of proof is quite definitely as indicated in the text. To deny the statement made is to assert that there is some absolute limit to the possibility of further substitution of capital for other factors of production, or to increasing the output from a given stock of other factors by using additional amounts of capital. It is surely "up to" the maker of such an assertion to offer a plausible suggestion as to the character of the limiting consideration. In the nature of the case, as it seems to me, there is no possibility of arguing my own position beyond making clear what it means. In a society with a zero interest rate it would be impossible to produce deliberately and at a cost anything whatever which would have value or utility or the use of which would be in demand in any way. The only thing that could be said to have value would be the instantaneous direct services of non-reproducible agencies. Even labor power itself is in reality largely capital in the sense in question here.

Space limits prohibit considering Professor Schumpeter's interest theory; the constructive position of this essay as a whole must suffice. In Part I it was observed that interest is merely the rent on productive agencies—or a share in or claim against this, stated in a special contractual form. (Professor J. B. Clark made the point long ago, and it seems strange that it should ever have required explicit statement.) There is a sense in which I would agree with the theory of no interest in a stationary economy. The chief reasons for this form of contract, in preference to one in the rental form, arise in connection with development, and other sources of uncertainty. I should expect loans at interest to be replaced mainly or entirely by leases at a rental under stationary conditions. (In a "rigorously" stationary state—the only hypothesis which has definite meaning—there would be little or no occasion for the existence of money itself!) In the field of consumption it is surely unthinkable that there should be no takers for loans without interest! With reference to Professor Keynes it should be admitted that conditions are imaginable under which the earnings of capital might not be sufficient to cover the costs and risks of lending money. These might be of nearly any magnitude, but under stable conditions do not seem likely to be such as to prevent all or most lending for productive use.

Recent discussion with Dr. Oskar Lange, who has worked out a supposed new defense for the doctrine that zero should be assumed as the equilibrium rate of interest, has suggested to me one direction in which the position taken in the text may be amplified, and under certain conditions might conceivably require qualification. If there should be an absolute limit to the possibility of substituting capital for other agencies in the special employment of maintaining and replacing concrete capital goods, as well as a limit to the possibility of producing new capital goods (desirable things of any sort) which require no maintenance or replacement, then there would be an absolute limit to the amount of capital which could be made to yield a net product, even while other agencies retained service value. I must say,

On the supply side the situation at any given moment is shown by a vertical straight line (parallel to the axis of price) through the point representing here-and-now (curve *QS* in the figure). The curve expresses the fact that the supply of capital at a moment is what it is, and cannot be changed without some lapse of time during which changes in the given conditions would inevitably occur. The diagram fits any price situation at a moment where price is in process of change (any situation other than equilibrium), whether it is the price of a commodity or of a service, assuming only that there are no speculative reservation prices or non-market uses affecting the supply in the market. In the case of capital, supply is quantity in the market or the corresponding rate (intensity) of flow of its service, and it is the service which is priced—on a per annum basis.

In terms of the diagram, what happens with the passage of time and further accumulation of capital is simply that the vertical supply curve moves to the right without change of shape. Its intersection with the fixed demand curve continuously shows the rate of interest as the marginal productivity of the quantity of capital which has been invested at (i.e., up to) any moment. That is, the diagram as drawn will fit the situation at any moment in the life of an economy if the appropriate scale is applied. With reference to the process of capital growth, the x axis of the demand curve becomes an axis of time as well as one of quantity of invest-

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not only that the assertion that either of these absolute limits is real seems to me to involve the same burden of proof as the more general assertion already discussed, but, in addition, that they both seem palpably contrary to fact. There seems to be no difficulty in suggesting literally innumerable cases of both sorts in which no limit would ever be reached. It seems to me self-evident that there is literally no limit to the amount which might be invested at some rate of yield in practically any single investment. The yield of any acre of land could be increased indefinitely. And the museums of Europe are crammed with illustrations of the amount of labor and other scarce services which it is possible to expend on a small article of furniture, piece of jewelry, or mere trinket. (In the Pitti Palace in Florence there is an ordinary cherry stone with the portraits of fifty-odd popes carved in relief on its surface!)

The law of proportions in the case of capital must, of course, be distinguished from what happens in the progressive application of any particular physically described agency. In the latter case there will undoubtedly be a limit to the increase in product from increasing proportions, beyond which still further applications of the particular factor will actually decrease the output.

ment, and the curve itself a kind of histogram of the rate of interest. But the time and quantity scales would, of course, be different and if the divisions on one were uniform, those on the other presumably would not be. The two, graphed on different axes, would give a true histogram of capital accumulation. (But the question of a scale of capital quantity is a difficulty reserved for later discussion.)

THE PROBLEM OF EQUILIBRIUM

The question of whether the process just depicted will ever establish equilibrium with a stable supply and price (rate of interest) is the question of the validity of a supply curve in the true sense. To draw a true (equilibrium) supply curve, we should have to begin by assuming that, if the interest rate of the starting-point (here and now) were maintained, along with all other given conditions, some definite total quantity of capital would ultimately be accumulated, and that (net) saving would then cease and the supply become stationary. If the assumption is legitimate, the end point will, of course, lie to the right of the here-and-now point and at the same level, hence above the demand curve. We have indicated such a point, P', as there is no difficulty in forming the idea. Then we should have to assume that similar points would correspond to other rates of interest under the same conditions of saving, i.e., corresponding to other points on the vertical line passing through P. We have drawn in a curve S_1S_1', supposed to connect the points of cessation of accumulation for a range of interest rates, again merely to show the idea of an equilibrium supply curve. If such a curve could legitimately be drawn, and if it intersected the given demand curve, its intersection (somewhere to the right of and below the here-and-now point) would indicate a long-run equilibrium interest rate—always assuming further that the given conditions of demand would remain unchanged while saving was being carried to the equilibrium point. All that can be known a priori about the supply curve is that it must pass through some point, P', lying to the right of P at the same level (corresponding to the same interest rate); this is proved by the fact that under these given conditions invest-

ment is actually going forward and the capital quantity increasing.

But there is no reason for assuming that at any given rate of interest saving would ever cease. How far P' would lie to the right of P in a horizontal direction, i.e., how much capital would ultimately be accumulated at a given interest rate under the given conditions of some actual economic system at some point in historical time, is a matter of pure conjecture; and the same applies *a fortiori* to every feature of the direction and shape of an imaginary curve through P' showing the limits of accumulation under the same conditions for a scale of interest rates. There is no reason whatever for believing that there is any such point as P' (i.e., that it does not lie infinitely to the right of P), as there is no reason to believe that under the given conditions and at the given interest rate capital accumulation would not go on forever. And there is no more reason for believing that there would be such a limit for any other interest rate, notably for the lower rates supposed to yield the lower branch of the curve S_1S_1', which is assumed in an equilibrium theory to intersect with the demand curve. All of the hypothetical supply curve may perfectly well lie at an infinite distance from the price axis.

We must next observe that it is certain, a priori, that the given conditions as they affect supply cannot possibly remain unchanged while accumulation goes forward. They must change in a sense favorable to further saving. For the new capital saved and invested must yield income to somebody (to the owners of capital and of other factors in some proportion), and the increased social income will make saving easier. This consideration operates to strengthen the probability that under given conditions (except for those which necessarily change) saving and accumulation might go on without limit. There is no presumption, even, that it might not go on forever at an increasing rate (speed), under a given rate of return, or even with a falling rate. For the increased ease of saving may more than counterbalance the decreased incentive—assuming always, arbitrarily, that the rate of return is in fact an incentive, positively connected with the rate of saving.

This is the essential peculiarity of the capital-and-interest situation as a case of price determined by supply and demand. The act of making any addition (however small) to the supply of capital (over some interval of time) necessarily changes the conditions of supply, the conditions under which any further addition will be made to total supply. This happens not merely because all economic conditions do change more or less with any lapse of time, but "necessarily," because accumulation of capital cannot go forward without changing them. And the change is favorable to the growth of capital which causes it, not of a sort tending to bring about or hasten saturation.[38]

Thus it is wholly illicit to argue that the process of capital accumulation moves toward saturation and a final equilibrium. The only supply curve applicable to the momentary situation shows the existing supply and is restricted to a single point. If supply increases through time, and the demand curve remains unchanged, the effect is to lower the interest rate (slowly) by movement along the demand curve. If saving does proceed less rapidly as the rate of return falls with increasing accumulation, the effect is simply a less rapid pace in this (slow) downward trend of the rate, which is continuously set by the momentary marginal productivity of investment. But there is no presumption that the return, as fixed by the yield, would ever cease to motivate further saving, or even that the rate of accumulation would fall (given the fixed demand curve). It is completely arbitrary and entirely misleading to draw such a curve as S_1S_1'. It has been discussed merely to explain the conception of an equilibrium interest rate which is put forward as a theory of the rate by so many writers, in order to show that it is untenable.

[38] In the case of gold, considered as a monetary commodity, and neglecting the non-monetary uses, accumulation must presumably change the conditions of production, but in the opposite direction as compared with capital, i.e., must increase the real cost instead of decreasing it. This follows from the principle of diminishing returns, which also holds for the physical alternative cost of any particular physical form of capital. In consequence, it is plausible to argue that the supply and price of gold (money metal) would tend toward equilibrium. This presumption is, of course, greatly strengthened by the fact of the commodity demand for gold, because for this demand equilibrium means not a situation in which there is no production, but one in which production merely balances actual consumption, keeping the stock constant.

Furthermore, the entire argument so far has rested on the assumption that the demand curve for capital service may remain unchanged while accumulation proceeds. While there is no a priori argument in the quasi-mechanical terms of price theory which proves this to be impossible, as in the case of supply, it is almost equally certain on historical grounds that the curve will not remain fixed, that the progress of saving will lead to social changes which will increase the total opportunities for investment and raise the curve as a whole. The simplest way in which saving would operate to produce this effect is, no doubt, that of stimulating (not the same as causing) invention. But there are other ways. For example, it is an accepted principle in economics that, as the wants of which an individual is conscious and which he strives to gratify at any time approach complete satisfaction, new wants will put in their appearance.

The notions of an equilibrium supply curve and of a demand curve remaining stationary with the lapse of time being both untenable, it is inadmissible to set up interest theory in terms of long-run equilibrium between the demand and supply of capital in the form of a stable total quantity in the market. The reality with which we must deal is, to repeat, a short-period situation, with an existing though continuously growing supply of capital and an interest rate which is always the marginal demand price of the momentary supply. We know that there is a demand curve with a descending slope, i.e., that, other things equal, further investment will lower the demand price (but never to zero), while any net disinvestment would raise it. But we have absolutely no knowledge of any relation between an equilibrium (total) supply and an equilibrium price, under any conditions.

The long-run changes which it is reasonable to anticipate cannot be treated in terms of any tendency toward equilibrium, and consequently cannot be treated in terms of price theory in the form of supply and demand curves or functions. In so far as prediction is possible at all, it must be assumed that accumulation will go forward, and that this process will tend to lower the marginal productivity of capital and the rate of interest. But, on the one hand, it will also inevitably increase the flow of income out of which savings may be made, and this will presumably tend to maintain

or increase the rate of accumulation. This last result, however, is by no means a conclusive inference from any generally accepted postulate as to the meaning of economically rational conduct. On the other hand, other social changes will be taking place, notably (if we can predict at all) the progress of invention. Thus we arrive at a view which may be stated in the words of Taussig: ". . . . the rate of interest for long periods . . . . depends on a race between accumulation and improvement."[39] But it must be kept in mind that a fall in the rate of interest in consequence of accumulation is inferable only on the assumption of a *relative* growth in capital in comparison with "other factors," agencies into the creation of which investment does not freely flow. And, on the other hand, again, a rise in the rate of interest in consequence of invention depends on the character of the invention. It is generally assumed that inventions tend to shift the marginal productivity in favor of capital as against other factors; i.e., inventions are regarded as labor-saving. But invention certainly does not necessarily have this effect, and is sometimes capital-saving, and it may affect labor and capital equally. In a general way it may be said, (*a*) that all social changes other than the accumulation of capital tend to create a new demand for capital, to raise the demand curve, and to offset the tendency of the rate of interest to fall in consequence of accumulation, and (*b*) that capital accumulation tends to lead to other social changes in great variety though of unpredictable or not accurately predictable character. The historical movement of the interest rate in modern times has been notoriously a seesaw. The essential fact for emphasis here is that movements of the interest rate over long periods depend on a balance between changes which can be predicted only in terms of historical and social-psychological "forces" (a term itself used figuratively)—in so far as they can be predicted at all; the process is entirely unamenable to analysis in terms of the categories of price mechanics.

THE THEORY OF CAPITAL SUPPLY

PSYCHOLOGY OF SAVING

As already noted, the great supposed advance made in the theory of capital by the older classical economists was the intro-

[39] *Principles of Economics* (3d ed.), II, 32.

duction of the notion of "abstinence" by Senior.[40] But it was also pointed out that neither Senior nor any of the other writers of the school actually used the abstinence doctrine to explain the rate of return. Senior and Mill regarded abstinence as the ground for the existence of "profits," and as setting a minimum below which the rate could not fall without putting a stop to accumulation. They may be said to have held a theory of the tendency of the interest rate toward an equilibrium in practically the sense of Marshall's view; but they did not work out such a theory and, of course, made no effort to connect the actual rate at any time with the subjective sacrifice involved in saving—or abstention from eating up capital already saved. The function directly performed by the abstinence doctrine in the classical system had to do with value theory, not with distribution. It served to reduce the capital element in cost to terms of pain, i.e., to make it homogeneous with labor cost.[41]

An abstinence theory of interest must obviously be a supply theory, and must take demand as infinitely elastic (or supply as negligibly elastic in comparison with demand), and can apply only at equilibrium in the sense in which our whole argument has shown such a theory to be untenable. In addition, it must of course be interpreted in the marginal sense.[42] The argument of this paper has dealt with supply only implicitly, in the form of the

[40] This *Journal*, August, 1936, p. 452.

[41] Böhm-Bawerk is no doubt especially responsible for the wide acceptance of the belief that Senior held an abstinence theory of profit. It is especially strange that he gives a very different characterization of Mill's position which, in fact, is essentially identical with that of Senior. It should be noted that the classical writers never really worked out a quantitative theory of abstinence as a cost, any more than as a basis for a share in distribution. The theory should, of course, be identical in the two connections, running in terms of equality at the margin. One of the notable acunae in the classical system as a whole is the failure to recognize that the costs which influence prices, namely, the relative money costs, which act indirectly through supply, are simply the payments for productive services, which in turn are identical with the distributive shares. And another defect is the failure to understand and apply the principle of small increments, the general logico-mathematical principle of differentials introduced into economics under the inappropriate name of marginalism.

[42] Short of such an equilibrium theory, it is of course reasonable to argue that the current interest rate at any time (immediately, the marginal productivity of the existing supply of capital) is the consequence of the psychology of saving as it has operated through past time—in relation to the existing demand situation.

question what it can mean to say that saving is a function of the interest rate, and with the consequences of assuming that such a functional relation exists. (The only consequence has to do with the rate of growth in the total supply of capital.) The task now is to inquire into possible reasons for saving, i.e., as to what may be inferred from any reasonable postulate as to the meaning of rational economic behavior in this connection. By rational economic behavior we mean the allocation of resources between alternative uses subject to diminishing returns measured in some common unit of value, in such a way as to realize maximum total return in value units to the choosing economic subject. In order to straighten out the tangled relations of the concepts involved, it is necessary to begin by considering the situation of an individual in a hypothetical position of equilibrium as regards saving, i.e., one disposed to maintain his individual stock of capital but not to increase it. The conception of such an individual is valid, though not typical for actual, capitalistically progressive, society.

In this situation abstinence must be interpreted as the sacrifice continuously incurred by an owner in not eating up the marginal increment of capital already saved, not as the sacrifice involved in the creation of an addition to an existing stock of capital. Senior, in general, held the second view; he said that the return on capital after the latter has passed into the hands of an owner other than the original saver is "rent," meaning that its use involves no sacrifice. Mill seems not to have realized the difference. In the second paragraph of his chapter on profits (Bk. II, chap. xiv) he clearly states the position here indicated as correct for equilibrium analysis; but at the outset of the chapter "Of the Law of the Increase of Capital" (Bk. I, chap. xi) he identifies abstinence outright with saving. Manifestly, abstinence in the latter sense is a phenomenon of a growing economy; in the former, it belongs to the ultimate "naturally-stationary" state (to be contrasted with the conception of given conditions arbitrarily imposed for purposes of analysis). It goes without saying that the classical writers never distinguished the two conceptions and, in particular, never formulated the second.[43] Analytically they be-

[43] The notion of a really or naturally stationary state is familiar in the writings of the earlier classical economists (from Smith to Mill); in our own generation the

long in two completely different universes of discourse, though psychologically the maintenance and the increase of capital are likely to appear the same to the individual, and in any case cannot be sharply distinguished; the individual cannot know accurately whether he is exactly maintaining his capital or over- or under-maintaining it.[44] And usage in economic theory unfortunately still justifies interchanging the two notions.

The question raised involves an ultimate philosophical issue as to the rôle of time in motivation. If a motive is to be regarded as the cause of an act, in the sense in which force is the cause of movement (against friction) in mechanics, then every act must have an instantaneously present motive. (Cause and effect cannot bridge a discontinuity in time any more than in space—the *actio in distans* principle.) In such a mechanical system of postulates, future satisfaction can function as a motive only in so far as it generates or is a present satisfaction. But such a view is hardly in accord with common sense; the ordinary meaning of rationality is anticipation—motivation "correctly" directing action in relation to the future. There seems to be an antithesis between rationality and economic rationality. Perhaps there is some connection between this circumstance and the fact that the literature of economic theory has shown so much confusion as to whether the general motive of economic activity is to maximize satisfaction or to "get rich."

From the standpoint of economic policy on the part of society toward an individual in the matter of saving, the idea of treating anticipated satisfaction as a present satisfaction leads to absurdity. It would imply that society might confiscate the yield of capital, after it is saved, on the ground that the equivalent of the sacrifice of saving had already been realized and the incentive performed its function. Such a policy would, of course, destroy the reality of the anticipation as a reward and its effectiveness as an incentive to saving. There seems to be a fundamental diffi-

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analytical assumption of stationary state or static state is more familiar (cf. L. Robbins, "The Conception of Stationary Equilibrium," *Economic Journal*, XL [1930], 194–214).

[44] In another view it is surely a psychologically real and vital question whether one is holding one's own, falling behind, or getting ahead.

culty, not generally recognized, in using economic principles to interpret activities directed to improving the condition of the individual at a future time, and in bringing this interest into comparison with that of maximizing current satisfaction in such a way as to apply the principle of maximizing by equalizing margins to the allocation of resources between the two modes of use.

Since about the time when the work of Böhm-Bawerk started the modern discussion of the psychology of comparison of present and future in a new set of terms—"underestimation," "foreshortening," "discounting," "perspective," "time preference," "impatience," etc.—it has been common to designate the sacrifice of present to future by the name of "waiting" rather than of "abstinence." This is generally regarded as the remedying of an obvious confusion.[45] Abstinence is, however, the more correctly descriptive term. The view that saving represents waiting would be correct under two assumptions, both of which are contrary to familiar fact. (The argument is closely parallel to that affecting the time-period theory of capital, dealt with in Part I of this essay.)

The first assumption which is necessary to validate the waiting theory, but which is contrary to fact, is that capital is in fact universally or necessarily alternately saved and consumed or invested and disinvested, i.e., that it takes the form of capital goods which are regularly produced, consumed, and reproduced. This is only in part the case, and the more carefully the facts are examined, the narrower will the limits be found to be within which it is empirically true. In the second place, even if it were true, the fact that capital is actually maintained (in fact, rapidly increased) would make it largely irrelevant. It cannot be too much emphasized—or apparently too often repeated—that the saving of capital is not to any considerable extent a matter of doing without a certain quantity of consumption over a limited period of time in order to consume the resultant capital with its increase during some later interval.[46] Investment is generally made with

[45] Marshall credits the "improvement" to Macvane in an article published in the *Quarterly Journal of Economics* in 1887; see Marshall's *Principles* (8th ed.), p. 233 n.

[46] This is the essential fallacy in Professor Fisher's theory of impatience as the basis of interest and of Professor Fetter's time-preference theory.

a view to permanence, i.e., perpetual maintenance in some form (the form being a matter of indifference to the general theory of capital), and it is only through maintained investment that an economic system can accumulate a substantial aggregate of capital and become capitalistic. As a matter of fact, even the income yield is not generally consumed, but is in considerable part invested. (There can be no doubt that the yield of property, in one form or another, is the main source of accumulation.) Waiting which is perpetual or even indefinitely protracted is correctly designated by the older term, "abstinence," and the change in terms, instead of constituting an advance, itself cloaks a fallacy.

It might be argued that the motive of saving is the consumption of the income, which is the thing to be waited for. But at ordinary interest rates the individual saver would, on the average, have to wait considerably beyond the end of his own life to consume the equivalent of the principal, if he stopped saving at, say, the peak of his earning power, and consumed all the yield, which as noted above he generally does not do, and which would greatly reduce the amount of capital accumulation. But the interval of waiting for a perpetual income is again infinite; even the center of a perpetuity beginning now is infinitely remote in the future. Abstinence is the only correct or descriptive term. Consumption in the indefinitely remote future is identical with non-consumption.[47]

[47] If we postulate an individual with unit income and a utility-of-consumption-income function $U = I^{\frac{1}{2}}$ and complete rationality—which certainly means indifference to time in consumption—and if we assume uncertainty absent and place the individual in a position to invest at will at interest rate i, it is readily shown that he will maximize the sum of utility for now and one-year-hence by saving $\frac{i}{1+i}$. (For other exponents or other forms of function the expression becomes involved.) But it is illicit to assume that the utility of consumption for an instant exactly one year hence is the sole motive of saving at the instant now. It is necessary either to think of a systematic plan or pattern of saving and consumption over future time, with uncertainty absent, or to recognize uncertainty as playing its dual rôle in the motivation. Realism calls for both a time-pattern and awareness of the uncertainty of the future. It is fair to note that the notion of instantaneously maximizing satisfaction by the perfect allocation of the income of the present instant is under critical scrutiny also unrealistic. All rigorous economic reasoning involves an antinomy because no one really wants his wants satisfied. But between comparison of present alternatives and comparison between present and future there remains the vital difference that for choices between present (or future) alternatives uncertainty is present in a sense very different from that in which it affects choices between benefits at different regions in time.

There is no reason to assume that, other things equal, normal human psychology contains any general tendency to underestimate the future, and it is as easy to argue for the predominance of the opposite irrationality. It is impossible to know whether the interest rate would be positive or negative in the absence of opportunity for productive investment. It would probably fluctuate violently over wide ranges from positive to negative as the seasons or passing occasions disposed a majority of the people to concentrate on work or rest or play. It would seem that there should be some variation between summer and winter rates in view of the concentration of industrial civilization in the North Temperate Zone, but the net alternate accumulation and decumulation are relatively small. To get at any general psychological attitude we should have to assume the existence of a society with inexhaustible sources of income and a free market for these, but with no possibility of producing any more sources of any sort, including (in the exclusion) all productive investment in human beings. What exchange ratio would then be established between nearer and more remote time segments of service flow is a question on which it is idle to speculate. It is as justifiable to assume that on the average men would want to get rich and would make sacrifices to that end as it is to assume that they would pay for the privilege of consuming in advance of production. (Or we might eliminate exchange of income sources along with their production and maintenance and restrict activity involving comparison between present and future to the storage of direct instantly consumable products. The conclusion will be the same.)

The issue as to time preference is often stated in an absurdly false way, in spite of the fact that Jevons was clear about it. It is true that I do not want to wait until tomorrow or next year for today's or this year's rations; but no more do I want to enjoy today or this year the consumption belonging to the more remote interval. It must always be remembered that the creation and maintenance of a supply of capital in a society depends upon men having or acting as if they had interests which look beyond their own lives (and in effect, to infinity, for complete maintenance over any interval is perpetual maintenance, as long as they keep on doing it or until they expressly plan to do otherwise).

Thus the notion of a comparison between present and future consumption reduces to a mathematical absurdity, where future consumption is spread over all future time and any finite quantity corresponds to a zero rate of consumption (or the lowest rate corresponds to an infinite quantity).

SUPPLY AND DEMAND IN TERMS OF RATES OF FLOW

We have seen that the supply curve, or function, for capital which is generally presented or assumed is not a supply curve at all; what is depicted is an assumed functional connection between saving, i.e., the rate of growth of capital supply (rate of growth of rate of flow of capital service) and the interest rate. A curve of saving is not a supply curve, and its intersection with a demand curve has literally no meaning whatever. Most of the expositions of capital-and-interest theory with which the writer is familiar seem to be vitiated by this confusion, which occurs in various detailed forms and varying degrees of crudity.[48]

As a matter of fact, it is wholly problematical whether there is any general relation between the interest rate and the rate of saving, or specifically, any relation of a sort which can be represented by a function or curve, and certainly no one is in a position to make any statement as to the character of the function, if it exists.[49] It has been frequently pointed out that on "rational"

[48] Explicit mention may be made of Marshall, Taussig, and Fisher, among the older generation of theorists, and also of Keynes and Robinson. Böhm-Bawerk's treatment of capital theory does not involve supply and demand functions or curves for capital in any explicit or clearly implied form, and the same is true of Fetter. The chief difference between the earlier and the later theories of Fisher (*The Rate of Interest*, 1907; *The Theory of Interest*, 1930) is that in the latter the demand for loans for productive use is more explicitly recognized and opposed to supply as psychologically determined (or impatience). There is still no clear analysis of the meaning of capital and the demand for and supply of capital service. (The confusion between psychology and technology, involving two distinct relations cutting across the notions of supply and demand, permeates nearly all price theory, but is especially troublesome in connection with capital and interest; the correct statement of the equilibrium cost-price relation is that the quantities of any two commodities which have the same market value will have at the same time identical [marginal] resource costs and equal marginal utility to all consumers of both goods).

[49] Any attempt to answer this question by empirical (statistical) investigation is apparently foredoomed to failure; it can hardly be possible to get data on a sufficiently inclusive sample of cases and at the same time to keep other things equal nearly enough to make correlation significant. See Paul H. Douglas, *The Theory of Wages*, p. 477.

grounds people in the same circumstances may save more or may save less at a higher rate of interest than at a lower rate. Because it is superficially plausible that the rate of flow of (new, net) saving into the market is an increasing function of the interest rate, the possible consequences of such an assumption are worth investigating. There is a sense in which a demand curve drawn in the same terms—a functional relation between the time rate of absorption of capital and the interest rate—has meaning. And this fact may partly explain the persistence in the literature of economic theory of the notion of an equilibrium represented by the intersection of a curve showing rate of saving as a function of the interest rate with a demand curve. The pseudo-demand-curve in question is strictly a short-run phenomenon; it is relative to unanticipated changes; and this fact makes the rate of absorption the independent variable, the interest-rate dependent, within the limits in which the relation holds. In the absence of uncertainty it becomes simply a horizontal straight line, showing that rate of absorption is independent of interest rate.

Plans for investment must be made a considerable time in advance, and changes in plans are necessarily rather slow and expensive. Hence, if funds flow into the market at a rate (time rate or speed) in excess of that at which plans already in course of execution will absorb them, the result will be a momentary "glut," with a reduction in the demand price (the interest rate); and reciprocally for a flow of savings less rapid than has been planned for. This reaction might be fairly sharp, giving rise at the moment to a considerable inelasticity of demand, or flexibility of price. (Such a phenomenon must not be confused with short-run market conditions in the usual sense, which result from the present feeling of uncertainty regarding the future.) But it is obvious that only in a special and limited sense does the rate of interest under such conditions reflect the investment opportunities open, or indicate the true demand price for capital. The phenomena should undoubtedly be taken into account in interest theory, but they are to be dealt with as effects of friction, in connection with inaccurate anticipation. ("Error" is the usual meaning of friction in economic discussion.) The theoretical demand curve for capital must

assume that plans have been made in correct anticipation of all pertinent facts, and must show demand prices under the condition of correct planning a sufficient time in advance to permit the absorption of capital as fast as offered, i.e., it must be parallel to the commodity axis. Given accurate planning, or sufficient time to adapt plans to the facts of the situation, the speed at which the market[58] will absorb funds in the process of real investment can never be less than the rate at which funds are forthcoming, at any rate of interest at which it will take them at all. It is a purely technological matter, and there is no reason why the entire productive capacity of society should not be used to construct new capital goods, if the population should decide to save all its income! This statement is not affected by the fact that the most economical speed of construction depends on the interest rate. Since the possible rate of absorption can never be a limiting factor —abstracting from friction in the sense of inaccurate planning— we are left with the conclusion already established, that the only real demand curve for capital (apart from momentary fixed supply) is one which depicts the functional relation between the total quantity of capital which could ultimately be absorbed by the market and the rate of return; the rate of return measures the marginal productivity of any quantity of capital, in the instantaneous sense explained in Part I of this study.

THE MEANING OF A CHANGING QUANTITY OF CAPITAL

The argument as a whole up to this point brings us back to the knottiest question of all—the meaning of the scale by which capital growth is to be measured. But all that can be said about it can be stated briefly. The essential fact is that there is no unique solution for this problem. The quantity of capital in an economic system has definite meaning only with reference to stationary conditions in the rigorous sense; that is, a system with given individuals, meaning individuals with given "wants, resources and

[58] It is to be noted that there are no real boundaries between markets, but only obstacles of various sorts and magnitudes which in various degrees impede the flow of capital from one part of the world-field of investment to another with equalization of the rate of return; most of the divergences which are met with at a given time can be accounted for under the vague category of risk.

technology," and with the system as a whole in equilibrium in the appropriate sense, already explained. Equilibrium (to repeat), must mean (*a*) that no individual can improve his status by changing the form of his consumption of forthcoming products at existing prices; (*b*) that production is so organized that the yield of no productive resource can be increased by making any change in the mode of its employment, with or without change in its form.[51]

Under these conditions the quantity of capital in any system is the aggregate obtained by capitalizing the anticipated net or perpetual yield in the marginal or incremental sense of invested consumption income, and multiplying by the total amount of (consumption) income which is considered as coming from capital goods. A capital good is any source of income in any form, for which the owner keeps a capital account, and a source of income is any desirable thing whatever. The income may take the form of exchangeable services, increase in value (balanced under stationary conditions by disinvestment in other assets of the owner) or non-exchangeable services, or simply pleasure of possession. The significance of capital accounting is to be taken in a managerial sense; i.e., (*a*) the service of the agency gets a definitely imputed value, quantitatively compared at the margin with other services and (*b*) the investment in the agency is subject to control and is so controlled that the rate of return (ratio of service value, for any time unit, to capital value) is kept equal to the rate for all other investments of the owner, which represent the best investment opportunities open. The category of capital goods would thus obviously include all land[52] and ought to include also the

[51] Under (*a*), the fixity of resources in the possession of each individual may again be taken in either of two senses. It may be assumed either that each individual is voluntarily disposed exactly to maintain his resources, or that the fixity may simply be arbitrarily imposed by the analyst, as an analytical device. See n. 43.

[52] Natural resources subject to depletion can be recognized in the setup of a stationary economy only to the extent that they are subject to reduplication through exploration and development expenditure at known cost. In the strict stationary state, reduplication must be taken literally, which of course is physically impossible, as it would mean identical location. Analysis must imperatively recognize and deal with other stationary states, in which products and/or productive resources are held stationary in a quantitative, evaluational sense, in relation to

personal earning capacities of the individual in so far as these present any possibility of deliberate over- or undermaintenance. In real life, of course, people practice capital accounting and management in connection with their personal capacities to a very limited extent.[53]

The conception of an economic system in which capital is increasing, but which is stationary in every other sense, presents many problems which cannot be investigated here; our concern is limited to a few main points regarding the measurement or quantitative definition of capital growth. From the standpoint of this special problem, we have to assume that the increase in income is accurately measured, which means, in effect, measured in money of unchanging purchasing power. (This itself presents in reality a problem for which there is no unique objective solution.) The problem of measuring capital then presents primarily the question as to whether or not we are constantly to recapitalize previous investment at the changing interest rate—the rate being presumed to fall in consequence of the diminishing return from further investment. To do so apparently yields a spurious growth in the quantity of capital. Yet in some connections this must rather obviously be done, and the limitation simply kept in mind. But it is to be emphasized that, for the purpose either of theoretical understanding or of management, it would not matter which procedure were followed, and in some connections recapitalization is misleading. For all theoretical or practical purposes quantities of capital, either simultaneously existing or one following the other in time, might be compared simply on the basis of income yield (reduced to perpetuity) or they might be capitalized at any arbitrary rate. Capital might be treated as an "ordinal" rather than as a "measurable" magnitude, and the x axis in our

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final services, defined qualitatively as well as quantitatively, but not in the sense of physical quantity; these conceptions require careful definition, but such problems cannot be gone into here.

[53] The reasons are, in part, clear or at least discoverable. But it is somewhat mysterious that ordinary thought and usage make a practically absolute contrast between all personal earnings, which are treated as net income, though they may be obviously divergent in either direction, and external property, the yield of which is considered to be only what is left after full provision for maintenance.

diagram regarded as having no scale. In diagramming, it might perhaps be represented by a broken line, to indicate this fact for pedagogical purposes. There would perhaps be a gain in realism if this procedure were generally adopted, especially for the total capital of an economy.

As suggested at the beginning of this part of the essay, it would be possible to develop the entire supply-and-demand analysis of capital and interest with the price and commodity magnitudes interchanged. That is, the commodity priced would be future income, and the price would be the present worth of such income, or the market value of sources yielding it. If expressed in ratio form, the price would be a number of years' purchase (of a perpetual income of any magnitude) instead of a per cent per annum. Demand would then be represented by rate of investment (new saving) and supply conditions by the cost of producing future income, i.e., of producing sources of such income. It would be the supply which would be indefinitely elastic, reflecting the fact that additional income (sources measured by yield) could be produced at very slowly declining cost, while supply would be practically inelastic because the quantity of saving could not be increased without some lapse of time. In general, the geometrical analysis would be the same as that given above, except that the axes would be interchanged.

This view would bring the problem of interest into closer conformity with the ordinary price analysis, treating the price of real things as determined by their cost (in the main, price-determining sense) which reflects the competition of other uses for productive services. For the purposes of the interest analysis there are two generalized competing alternatives—the use of resources in producing current consumption services and their use in making some addition to the total stock of sources of service in the economy. As a matter of fact, the interest problem is a refinement of this ordinary price problem, since both the cost and the utility of any item really involve interest.

A COMPARISON OF INDUSTRIAL GROWTH IN FRANCE AND ENGLAND FROM 1540 TO 1640. III

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IX. THE "NEW" MANUFACTURES

BETWEEN the birth of Leonardo da Vinci, in 1452, and the death of Francis Bacon, in 1626, there was a remarkable development in Europe of industries like printing and tobacco-rolling, which were entirely novel; of others like the making of paper, soap, sugar, and gunpowder, for which the demand had been slight; and of still others like the making of alum, for which Europe had been mainly dependent upon the older civilizations in the Near and the Far East. While none of these "new" manufactures had come to employ as many workpeople in seventeenth-century Europe as older industries like mining or the smelting of ores, the laborers employed in all of them, taken together, ran into tens of thousands in every important country.

Their development had a significance beyond that which can be measured by the number of hands engaged. Most of them required machinery or furnaces, cisterns, boilers, and other equipment which cost hundreds, and in some cases thousands, of pounds. Consequently the making of alum, soap, or gunpowder, unlike the weaving of cloth, the grinding of knives, or the forging of nails, called for much more capital than groups of small craftsmen could possibly muster. Nor was there as much opposition to the establishment of large-scale enterprise in the new industries as in the old. Regulations of the gilds and of municipal governments, inherited from the Middle Ages and designed to restrict the number of journeymen and apprentices who could work for a single master, were more difficult to apply and to enforce than in the older industries, where they had the support of long-estab-

lished custom. The enterprises in most of these new manufactures frequently employed many workmen—a dozen, a score, or even more—laboring in buildings reconstructed or built specially for manufacturing, instead of in the cellars or garrets or small shops which continued to serve most of the craftsmen in the textile and the metal-finishing trades. Some of the new industries, such as alum and copperas-making, developed—like mining, smelting, and salt-making—in rural areas, but there were others, such as printing, soap-boiling, sugar-refining, and brewing, which invaded the old towns. These towns had been largely free from small factories during the Middle Ages, when they were the chief centers of industrial life. The rise of the new industries did much to establish the factory form of enterprise in those ancient citadels of independent craftsmanship.

Were the new manufactures growing more rapidly in England or in France during the century following the Reformation? Did they occupy a more prominent place in the kingdom of Charles I or in that of Louis XIII?

Thomas More, who wrote in his *Utopia* about the harm done to men's morals by gold and silver and the benefits which mankind derived from iron, had practically nothing to say about the products of the new manufactures. Even at his death, in 1535, these industries were carried on in Great Britain in a very small way, without the machinery or the large furnaces and boilers which were already common in some regions of the Continent. Their rapid development, which began in the forties or fifties of the sixteenth century and became most striking during and after the seventies, played a prominent part in the early English "industrial revolution."

A little gunpowder had been made in England as early as the reign of Henry VI.[1] In 1554 or 1555, not long after the introduction into Sussex of the method of casting iron cannons, a mill was established in Surrey,[2] and the manufacture of gunpowder, like that of saltpeter, which was indispensable in its production, grew and flourished from this time. Saltpeter was being made in

[1] Sloane MSS (British Museum), 1039, fol. 93.

[2] *Victoria County History of Surrey*, II, 246.

some quantities as early as 1561.[3] While the kingdom remained partly dependent upon imports of gunpowder, as well as of saltpeter, at least as late as the seventies of the sixteenth century,[4] the proportion of the supplies of both obtained from domestic manufactures increased during Elizabeth's reign. Commissioners for saltpeter were appointed by the Crown, and by 1588 English powder mills were so important that these commissioners planned to supply them by a considerable manufacture of saltpeter in many counties.[5] The saltpeter men appointed to obtain the raw materials came to be regarded everywhere as a nuisance by householders, particularly the poorer sort. Armed with a royal warrant, which permitted them to enter private as well as public property, they ransacked the incrustations of buildings and barns for peterish earth to boil in specially constructed copper kettles set in iron frames.[6] Their disregard of personal privacy was carried to such lengths, according to reports, that they entered even the bedchambers of the dying and of women in childbirth.[7] People became so incensed that they tried to prevent the growth of peterish earth in and near their homes.[8] Although saltpeter was manufactured at the end of the sixteenth and beginning of the seventeenth centuries in and around London, in the north and west of England, and in Wales,[9] the annual output in 1636 did not much exceed three hundred tons, a figure which apparently had been reached as early as 1589.[10] The progress of the manufacture was

[3] *Calendar of State Papers, Domestic*, 1547–80, p. 172.

[4] *Ibid.*, p. 117; Addenda, 1566–79, p. 495.

[5] Lansdowne MSS, 58, No. 63; Harleian MSS, 1926, No. 118.

[6] Cf. Star Chamber Proceedings (Public Record Office, London), 8/173/27.

[7] E. Lipson, *The Economic History of England* (London, 1931), III, 358–59.

[8] *Calendar of State Papers, Domestic*, 1628–29, p. 101.

[9] *Ibid.*, 1581–90, pp. 112, 607, 612, 623; 1591–94, p. 187; 1595–97, p. 153; 1625–26, p. 490; 1627–28, p. 480; Star Chamber Proceedings, 8/128/18 and 19; State Papers Domestic, Charles I, Vol. CCCXLI, No. 68. By 1591 London was receiving shipments of saltpeter from Hull (Exchequer K. R. Port Books [Public Record Office], 9/3). Cf. Nef, *Rise of the Coal Industry*, I, 186 n.

[10] *Ibid.*, p. 211. Cf. *Calendar of State Papers, Domestic*, 1595–97, p. 153, where there is a reference to an annual output of three hundred *lasts* of saltpeter. A *last* of saltpeter was apparently equivalent to about 2,100 lb., a *last* of gunpowder to about 2,400 lb. (*ibid.*, 1635, p. 57; 1598–1601, p. 471).

held up by a shortage of wood ashes as well as of peterish earth.[11]

The output of gunpowder, unlike that of saltpeter, increased somewhat during the reigns of James I and Charles I. In 1600 the Crown patentee, who had been granted a monopoly of the gunpowder manufacture, was bound to supply the queen every year with one hundred lasts, a shade more than one hundred tons.[12] By 1626, the holder of the patent—John Evelyn, an uncle of the diarist—was under contract to deliver twenty lasts a month.[13] Both he and his successor, Samuel Cordewell, sometimes fell short in their deliveries for want of adequate supplies of saltpeter. The restrictions placed on its importation to relieve the saltpeter commissioners from foreign competition were proving a handicap to the native manufacture of gunpowder;[14] and, as the Crown, in preparation for war, was sometimes obliged to import considerable quantities of powder,[15] the admiralty officials felt that neither the saltpeter nor the gunpowder monopoly was giving the desired results. On more than one occasion it was suggested that both be abandoned and that any man be allowed to manufacture gunpowder from foreign saltpeter.[16] That policy was not adopted until 1641.[17] But the attempts to enforce the saltpeter and gunpowder monopolies were not very successful.[18] Some saltpeter was imported,[19] and gunpowder was made outside the patent at Bristol, where there were three or four horse mills at the beginning of Charles I's reign, at Battle in Sussex, and in Dorsetshire, where there were water mills,[20] and also on a smaller scale at

[11] See, e.g., *Calendar of State Papers, Domestic*, 1635–36, pp. 358, 433.

[12] *Ibid.*, 1598–1601, p. 471 (cf. above, n. 10).

[13] *Ibid.*, 1625–26, p. 236.

[14] *Ibid.*, 1637, p. 188; 1638–39, p. 443; 1640–41, p. 313.

[15] *Ibid.*, 1625–26, p. 236. But there were occasions when the Crown was oversupplied, and license was granted to export gunpowder (*ibid.*, 1580–1625, p. 522).

[16] *Ibid.*, 1625–26, p. 236; 1635–36, p. 20.

[17] W. Cunningham, *The Growth of English Industry and Commerce, Modern Times* (6th ed.; Cambridge, 1919), p. 61.

[18] *Calendar of State Papers, Domestic*, 1627–28, p. 492; 1633–34, p. 290; 1637–38, pp. 32, 150.

[19] Cf. *ibid.*, 1638–39, p. 443. [20] *Ibid.*, 1627–28, p. 493.

various places in the west of England.[21] The mills of the patentees and their associates were all to the south of London or along the Thames.[22] Those of the Evelyns at Long Ditton and Godstone, and the one built by Cordewell at a place called Chilworth in Surrey,[23] apparently took up almost as much land, with their dams and waterwheels and the specially built buildings for drying the product, as the new smelting furnaces. In the late thirties of the seventeenth century Cordewell managed to deliver most of the 240 lasts a year which he had promised.[24] As a good deal of powder was made outside the patent, the annual output in England probably exceeded three hundred lasts.

The brewing of beer, as distinct from ale, was also something of a novelty in the sixteenth century. Before the reign of Henry VIII, what little beer was drunk in England was either imported or brewed by foreign craftsmen from foreign-grown hops. By the beginning of Elizabeth's reign conditions had changed so greatly that an appeal was made to the queen for license to export three thousand tons of beer.[25] Rapid progress in the native manufacture began with the domestic growing of hops, which were hardly cultivated at all in England until shortly before 1549. In the forties beer was still regarded by an Englishman as "a naturall drynke for a docheman." But its consumption was increasing; for the same writer adds, "of late dayes it is moche used in Englande to the detryment of many Englyshemen, speciyally it kylleth them the which be troubled with the Colyeke and the stone. . . . ."[26]

[21] *Ibid.*, 1628–29, pp. 118, 544. The saltpeter commissioners also made some gunpowder on their own account, and the East India Company apparently carried on a manufacture with Indian saltpeter (*ibid.*, 1637–38, p. 242; 1627–28, p. 492).

[22] On the Thames there were small works at Windsor, Henley, and other places, which were apparently in operation only once in every six or seven years (State Papers Domestic [Charles I], Vol. CCCXCIII, No. 13). Whether these works and the mills at a place called Halten, in Middlesex, and at another place called Redriffe (Star Chamber Proceedings, 8/128/18 and 19; 8/219/21) were operated under an agreement with the holder of the gunpowder patent is uncertain.

[23] *Calendar of State Papers, Domestic*, 1639–40, p. 512.

[24] *Ibid.*, 1637, p. 548; 1638–39, p. 118; 1639–40, p. 67; 1640–41, p. 303.

[25] *Ibid.*, 1547–80, p. 119.

[26] Hubert H. Parker, *The Hop Industry* (London, 1934), pp. 5–7.

During the reign of Elizabeth, if our writer is to be trusted, the death-rate from this cause must have increased enormously! The annual production of the London breweries alone was estimated in 1585 at 648,960 barrels—or upward of 150,000 tons—of beer.[27] This was more than half the output in the capital nearly two centuries later.[28] The Londoner in Shakespeare's time apparently drank at least as much beer as his descendants in the time of Johnson or of Dickens, and a good deal more than the Londoner today. English brewers, whose predecessors had learned their craft from the Dutch and the Flemish, had become so proficient by the nineties of the sixteenth century that they were exporting beer in large quantities even to Ostend, Flushing, and other places in the Low Countries.[29] The exports to all foreign nations already amounted to many thousands of tons annually.[30]

During the early decades of the seventeenth century there was apparently a very remarkable development of brewing throughout the country, especially in provincial towns,[31] where innkeepers and alehouse-keepers, who made their own beer, were frequently regarded as competitors by persons who specialized in the manufacture.[32] In the reign of Charles I, there were scores of brewers in most important counties. One table, apparently incomplete, listed 643 in England and Wales.[33] Their products were reaching even the humblest; for in the seventeenth century beer and ale had become, next to bread, the chief stay of the poor. As a gallon of "wholesome small beer" sometimes sold for as little as a penny,[34] it is no wonder that the consumption of beer per capita should have been greater than in our own time.

[27] Lansdowne MSS (British Museum), 71, fol. 53. The barrel contained thirty-six gallons. Four of the sixteenth-century barrels appear to have been roughly equivalent to a ton (*Calendar of State Papers, Domestic*, 1591–94, pp. 192, 136).

[28] Parker, *op. cit.*, p. 45.

[29] *Calendar of State Papers, Domestic*, 1581–90, p. 693; 1591–94, pp. 115, 508, 574.

[30] *Ibid.*, 1598–1601, pp. 87–88.

[31] That is the impression conveyed by the *Calendar of State Papers, Domestic passim.*

[32] E.g., *ibid.*, 1637, p. 49; 1637–38, p. 108.

[33] *Ibid.*, 1637–38, pp. 108–9.

[34] *Ibid.*, pp. 580–81.

Before the end of the sixteenth century tobacco was being brought from America, and the manufacture of pipes had begun. During the first two decades of the seventeenth century tobacco-growing spread scarcely less rapidly than hop cultivation had been spreading through many English counties, to the despair of the king's advisers, who wanted the land reserved for growing grain. In spite of statutes and proclamations prohibiting the planting of the new weed and orders to the militia to tramp it down wherever they found it growing, tobacco-raising was not completely stamped out until at least the end of the seventeenth century.[35] But the supplies of home-grown tobacco did not begin to satisfy the increasing demands of smokers. Partly as a result of the original proclamation of 1619 against tobacco-growing in England and of another proclamation of 1625 prohibiting the importation of all tobacco except that of Virginia or the Bermudas,[36] the imports from Virginia increased from 20,000 pounds in 1619 to 1,300,000 pounds in 1631.[37] Before that time tobacco-rolling,[38] and the baking of pipes in London and in Shropshire had taken their places, along with saltpeter- and gunpowder-making and beer-brewing, as established English manufactures.

By the beginning of the seventeenth century it had become an important objective of English economic policy to encourage the finishing processes in the textile industry—scouring, fulling, dyeing, and dressing—by restricting and even prohibiting the export of cloth undyed and undressed. The attempt, in James I's reign, to prohibit altogether the export of unfinished cloth would have proved a much greater calamity than it did for the spinners and weavers,[39] who were still partly dependent on foreign markets, had it not been for the growing domestic manufacture of four materials indispensable in the finishing processes: alum, which was

[35] Lipson, *op. cit.*, III, 169–71.

[36] *Calendar of State Papers, Domestic*, 1625–26, p. 7. Licenses were granted, however, permitting the import of some foreign tobacco (*ibid.*, p. 576; 1627–28, p. 58).

[37] C. M. MacInnes, *The Early English Tobacco Trade* (London, 1926), p. 134.

[38] Cf. *Calendar of State Papers, Domestic*, 1638–39, pp. 546–47.

[39] Cf. A. Friis, *Alderman Cockayne's Project and the Cloth Trade* (London, 1927), esp. chaps. v and vi.

needed for dyeing in all colors; copperas or green vitriol for dyeing in black; soap for scouring cloth as well as wool; and starch for dressing.

Some alum, inferior in quality to that of the Near East, had been made in England and other parts of Europe during the Middle Ages. But the textile workers in the Low Countries and even in Italy, as well as in England, had been almost altogether dependent upon imports from the Levant, until the discovery about 1462 of abundant supplies of alum stones in the papal lands in central Italy, and the development there of an alum manufacture based upon a technique borrowed from Asia Minor. As the Papacy derived a substantial revenue from the new industry, successive popes, in their efforts to defeat the Infidel, sought to obtain a monopoly of the European market by threatening to excommunicate not only the traders who sold eastern alum but also the civil and religious authorities who tolerated such a trade. These threats never had much effect upon the English trade in levantine alum; and, before the end of the sixteenth century, the efforts of the Papacy to monopolize the English market were rendered futile by the rise of a native alum-making industry.

During the first part of Elizabeth's reign many attempts were made to develop this manufacture in England,[40] first on the Isle of Wight, where alum stones had apparently been discovered before 1346.[41] These attempts met with indifferent success, but they seem to have brought about an improvement in the quality and an increase in the quantity of the domestic product.[42] In 1581 Burghley felt that the English supplies were satisfactory enough for him to embark on a policy of levying duties on papal alum.[43] By the accession of James I, abundant fresh deposits of stones had been found in Yorkshire—near Whitby,[44] in Durham—at Hartlepool,[45] and probably in other counties. A proclamation prohibit-

[40] *Calendar of State Papers, Domestic*, 1547–80, pp. 253, 277, 443, 534; W. H. Price, *The English Patents of Monopoly*, (Cambridge, Mass., 1906), p. 82.

[41] L. F. Salzman, *English Industries of the Middle Ages*, (2d. ed.; Oxford, 1923), p. 208.

[42] *Calendar of State Papers, Domestic*, Addenda, 1566–79, p. 344.

[43] *Ibid.*, 1581–90, p. 16. [44] Price, *op. cit.*, p. 83.

[45] Exchequer K. R. Port Books (Public Record Office, London), 185/10, which shows that coal was imported at Hartlepool for use at the alum pans in 1600.

ing the import of all foreign alum was passed as early as 1609.[46]

Two years earlier the Crown tried to establish a monopoly of the alum manufacture in the hands of a group of royal patentees, who invested many thousands of pounds in building near Whitby a series of large alum houses, each of which contained brick cisterns and furnaces and large metal pans and employed about sixty workmen.[47] The output of these houses did not ordinarily exceed 1,000 tons a year between 1609 and 1618,[48] and it fell to 313 tons on the average between 1619 and 1624.[49] But there was a great improvement in the productivity of the enterprise during the thirties.[50]

The Yorkshire works were not the only source of domestic supplies. Notwithstanding the exclusive patent granted to their owners, an alum factory, owned at one time by Lord Lumley, a great Durham landowner, and started at Hartlepool at least as early as 1600, was apparently in pretty continual operation during the reigns of James I and Charles I.[51] Between them the enterprises at Hartlepool and in Yorkshire produced upward of 2,000 tons a year in the late thirties of the seventeenth century,[52] and there were smaller factories elsewhere.[53] As the alum required to

[46] *Calendar of State Papers, Domestic*, 1603–10, p. 521. The proclamation was renewed later (*ibid.*, 1611–18, pp. 256, 527).

[47] Nef, "The Progress of Technology and the Growth of Large-Scale Industry in Great Britain, 1540–1640," *Economic History Review*, V (1934), 6. For the history of the royal alum works see Price, *op. cit.*, pp. 83–100.

[48] Lansdowne MSS, 152, No. 6, fol. 17. [49] Price, *op. cit.*, p. 95.

[50] Nef, *Rise of the Coal Industry*, I, 209; Price, *op. cit.*, pp. 97–98; *Calendar of State Papers, Domestic*, 1637–38, pp. 33, 97.

[51] Exchequer K. R. Port Books, 185/10, 186/2; Exchequer Depositions by Commission, 9 Charles I, Mich. 11 (testimony of Sir John Hedworth).

[52] This is partly based on our knowledge that the two enterprises consumed upward of 7,000 tons of coal annually during the decade preceding the Civil War (Nef, *Rise of the Coal Industry*, I, 209). By 1637 the works in Yorkshire alone were apparently producing 1,800 or 2,000 tons of alum per annum (*Calendar of State Papers, Domestic*, 1637, p. 152; 1637–38, p. 97).

[53] E.g., in Dorset (*ibid.*, 1629–31, p. 553). There was an alum house in London near the Tower at the beginning of Charles I's reign, but it was suppressed in 1627 (*ibid.*, 1627–28, pp. 269–70, 274). Alum stones were discovered near Newcastle-on-Tyne in 1612 (Lansdowne MSS, 152, No. 6, fol. 111), and in the twenties there was talk of transferring the royal works from Yorkshire to the Tyne valley (Price, *op. cit.*, p. 97). Small quantities of alum were exported from Newcastle in the thirties (Exchequer K. R. Port Books, bdl. 191).

supply the whole realm had been estimated in 1595 at rather less than 500 tons,[54] it is plain that the domestic manufacture had made great strides since the death of Queen Elizabeth. The dyeing industry, which was said to be growing to perfection as early as 1593,[55] must have been much benefited. Although some papal alum was still smuggled into the country in defiance of proclamations prohibiting its importation,[56] the aim of the Crown to make England independent of foreign supplies had been nearly realized. A small export trade, destined to grow considerably in the late seventeenth century, had begun.

A similar position had been secured with regard to supplies of copperas. Most of the projectors who tried to develop the manufacture of alum in Elizabeth's reign proposed to combine it with the manufacture of copperas, and their efforts seem to have met with some slight success.[57] Copperas works were also started independently of alum houses.[58] In the seventeenth century a combination of the copperas with the alum manufacture proved impracticable, because good copperas stones were found in different localities from alum stones. After Elizabeth's reign the two industries were carried on separately, the manufacture of copperas mainly in southeastern England, where one of the chief factories was at Queenborough in Kent.[59] But the industries were still linked together in the minds of many subjects. In 1655 the value of all the alum and copperas annually produced was estimated at £55,000.[60]

Early in the sixteenth century soap had been so scarce in England that urine was widely used in place of it for cleaning wool preparatory to spinning and weaving. Along with the building of alum and copperas factories in rural areas during the reigns of

[54] I.e., 8,000 or 10,000 quintals (*Calendar of State Papers, Domestic*, 1595–97, p. 102).

[55] *Ibid.*, 1591–94, p. 337.

[56] Nef, *Rise of the Coal Industry*, I, 185.

[57] *Calendar of State Papers, Domestic*, 1547–80, pp. 253, 272, 277, 436, 440; 1581–90, p. 32.

[58] *Ibid.*, 1591–94, p. 570. [59] Nef, *Rise of the Coal Industry*, I, 185.

[60] State Papers Domestic, Interregnum, Vol. XCIV, No. 106.

Elizabeth and her two successors, went the establishment of a number of soap factories in London, which became the principal center for supplying the entire kindgom.[61] Many starch houses of considerable size were started during the same period. Before the Civil War about forty of these houses were in operation, and one of them was said to consume annually fifteen hundred quarters or more of wheat.[62] The London soap factories were producing something like five thousand tons of soap a year in the thirties of the seventeenth century, and soap houses in the western counties—some of the most important of them at Bristol and Exeter[63]—nearly again as much.[64]

The remarkable progress between 1540 and 1640 of these "new" manufactures—and of others such as printing, papermaking, sugar-refining, and pottery-making—had greatly improved England's industrial position in Europe. Before the middle of the seventeenth century she had already established a great lead over France in the manufacture of alum, beer, tobacco, and smokers' pipes.

France produced little or no alum.[65] The French dyers, in the sixteenth century were dependent upon that which came from the Levant or from Italy or Spain.[66] Before the end of Louis

[61] *Calendar of State Papers, Domestic*, 1547–80, pp. 605, 692.

[62] Cotton MSS (British Museum), Titus B. V. fol. 388. This document, which deals with the consumption of wheat in starch-making, is undated, but it apparently belongs to the reign of either James I or Charles I.

[63] *Calendar of State Papers, Domestic*, 1635, pp. 62, 69; 1638–39, p. 240.

[64] Scott, *Joint-Stock Companies to 1720*, I, 211, 213–14; S. R. Gardiner, *History of England* (London, 1901), VIII, 72, 75. Cf. *Calendar of State Papers, Domestic*, 1636–37, p. 51. For soap-making at various places in the west country, see *ibid.*, 1637–38, p. 142. Some soap was also made at York and Newcastle-on-Tyne (*ibid.*, 1639, pp. 5, 363–64; 1639–40, p. 602).

[65] In 1611 and again in 1615 the Crown, by decree and letters patent, granted a certain Jérôme Comens the right to manufacture alum anywhere in the kingdom where he could find stones (*Inventaire des archives départementales*, Haute-Garonne, B. 1913, fols. 165, 169). But little apparently came of the grant.

[66] *Inventaire des archives départementales*, Bouches-du-Rhône, B. 3326, fols. 150, 155; Archives du Nord (Lille), B. 1834, fols. 22–24, 48–51. I am very grateful to M. Georges Espinas and to M. de Saint Aubin, the chief archivist at Lille, for helping me to obtain copies of these and other documents in the archives départementales.

XIII's reign France had probably begun to import supplies from England and from the neighborhood of Liége, where the alum manufacture apparently developed at about the same time as in Yorkshire and Durham.[67] Savary des Bruslons, who was not given to minimizing the importance of his country's industries, wrote early in the eighteenth century that France was still entirely dependent upon foreign alum. England, together with Italy and the principality of Liége, had come to furnish the bulk of French supplies, although a small portion still came from Asia Minor.[68]

Little beer was made anywhere in France except in the northeast. In Flanders, Artois, and Picardy, brewing was carried on extensively in the sixteenth and early seventeenth centuries at Lille, Cambrai, and a number of other towns, and in some villages.[69] But Flanders and Artois were not annexed to the French kingdom until the reign of Louis XIV. Inns or alehouses dispensing beer and ale, which were to be found every few doors in London and most English provincial towns, were practically unknown in the greater part of France. Wine took the place of both beverages—except in Normandy, where cider was drunk—in almost all the French provinces, as it had done for ages and as it was to continue to do down to the present time. The wealthy alone could afford the fine vintages, but nearly every region provided *vin ordinaire* in such abundance that it formed a part of the nourishment not only of craftsmen and peasants but of their children down to those of a very tender age.

The work of wine-making in seventeenth-century France differed from that of brewing in important respects. It was done not in towns but on the manors where the vines grew, according to ancient customary agreements between the local lord and his tenants. It did not require much capital, and its development seldom, if ever, led—as the development of brewing frequently did—to the progress of the factory form of enterprise.

[67] Archives du Nord, B. 1835, fols. 173–76, 178–80, 248–49.

[68] *Dictionnaire universel de commerce* (Geneva, 1742), Vol. I, art., "Alun."

[69] Archives du Nord (Lille), B. 1835, fols. 15–16; B. 4032, fols. 179–82; Archives de l'Aisne (Lens), E. 451 (min. de Floury); *Inventaire des archives communales de Cambrai*, AA. 103, fol. 83; BB. 1, fol. 24; BB. 2, fol. 86; CC. 220, fol. 16; DD. 5; DD. 39; EE. 101.

One of the few English habits which astonished French travelers before the middle of the seventeenth century more than the wholesale drinking of beer was the immoderate desire for tobacco that prevailed throughout the kingdom.[70] Thick clouds of tobacco smoke greeted them whenever they entered English inns and taverns, and they spoke with contempt of the new weed which they sometimes associated with scenes of drunken debauchery. Smoking was fast becoming the consolation in England of "the base vulgar sort," who labored for wages in the new factories, carried sacks of coal, or worked at looms and hearths in village cottages or in town garrets and cellars. It had been taken up before the end of the seventeenth century even by peasant women in Cornwall. It was not, of course, a habit from which the French were altogether free. Michelet deplored the use of tobacco in the early seventeenth century among the sailors of Bayonne and Saint-Jean-de-Luz, who were the first Frenchmen to be introduced to this product of the new world.[71] But, compared with the English, the French had hardly been tainted as yet by what Michelet called the new "demon." When, in 1626, the *parlement* of Normandy registered the king's letters-patent authorizing experiments with tobacco growing near Rouen, it was on condition that the tobacco should be released for consumption only if the physicians of the town had made a favorable report upon the effects produced on the health of the smokers.[72] The manufacture of tobacco and the baking of smokers' pipes were not taken up with such avidity in the France of Louis XIII as in the England of James I and Charles I, because there was a much smaller demand for the products.

There was probably no other industry among the new manufactures, unless it was the making of copperas, in which England had gained as decisive a lead over France on the eve of the Civil War as in brewing, tobacco-rolling, pipe-making, and the production of alum. In printing and in the manufacture of paper France

[70] *Calendar of State Papers, Domestic*, 1627–28, p. 58.

[71] *Histoire de France*, Vol. XIII, chap. xvii.

[72] E. Gosselin, *Documents pour servir à l'histoire de la marine normande* (Rouen, 1876), p. 131.

retained an advantage as late as the middle of the seventeenth century. This advantage she owed largely to the remarkable progress made by her printing industry during the last decades of the fifteenth century, when the introduction of the press and of movable type made it possible to pour out multiple copies of written matter by machinery. The first French printing press was set up in Paris in 1470. Thirty years later the capital had at least thirty printing establishments, a few with four or five presses; Lyons, which was becoming one of the most famous centers for printing in Europe, had almost as many establishments as Paris; and the new industry was carried on in at least forty other French towns.[73]

During the hundred years covered by this essay, the output of books and other printed matter continued to increase in France, but at a slow pace. The period from 1540 to 1590 was one of strikes among the journeymen printers of Paris and Lyons, and of religious wars;[74] it was not favorable to the progress of the French printing industry. But it was a period during which the production of books in London grew a great deal. Although the first English press had been set up as early as 1478, little printing was done in England at the beginning of the sixteenth century, and most of the books sold were imported, mainly from Paris and Rouen.[75] In Henry VIII's reign attempts were made to reduce the imports.[76] While many books for the English market continued to come from abroad during Elizabeth's reign, London had begun to overtake Paris as a center for printers. A survey made in 1583 put

[73] P. Mellottée, *Histoire économique de l'imprimerie* (Paris, 1905), pp. 453–54. Mellottée's list includes Paris and forty other towns, but it is incomplete. He does not mention Bordeaux, although it has been shown that a printing establishment was started there in 1486 (Ernest Gaullieur, *L'imprimerie à Bordeaux en 1486* [Bordeaux, 1869]). For Lyons, see also H. Hauser, *Ouvriers du temps passé* (5th ed.; Paris, 1927), pp. 178–79; Lucien Romier, *Le royaume de Catherine de Médicis* (Paris, 1925), II, 80.

[74] Mellottée, *op. cit.*, p. 454; Hauser, *op. cit.*, pp. 179 ff.

[75] E. Gordon Duff, *A Century of the English Book Trade* (London, 1905), pp. xi, xiii; also *The English Provincial Printers, Stationers and Bookbinders to 1557* (Cambridge, 1912), p. 125.

[76] *The Cambridge History of English Literature*, IV (1910), 458.

the number of presses at fifty-three,[77] distributed among about twenty-five printing houses,[78] more than half as many as were then to be found in Paris[79] with its larger population.

During the first quarter of the seventeenth century printing in Paris and in the French provinces increased in importance.[80] In 1645 Paris had seventy-six houses with 183 presses.[81] The growth of the business in London, and also in Oxford and Cambridge, was impeded in 1586 by a decree of the Star Chamber forbidding any further increase in houses or presses.[82] It was only after 1640, when these restrictions were relaxed, that the industry grew rapidly. By 1649 London had upward of sixty printing houses and was very nearly abreast of Paris.[83] But little had been done in English provincial towns to overcome the great lead which had been won for French provincial printing by the beginning of the sixteenth century. There was an actual decline in the number of provincial houses in England from 1557 to 1582, and in the latter year Christopher Barker, the queen's printer, said an estimate of "8 or 10 at the most would suffice for all [provincial] England, yea and Scotland too."[84] While the proportion of English books printed abroad had been substantially reduced between 1540 and 1640, and while the French share in the English import trade had also diminished, the output of printed matter per capita in France in Louis XIII's reign still exceeded that in England.

In many parts of France cornmills, turned by waterwheels rotating in the moving streams, had been successfully converted into paper mills in the late fifteenth and early sixteenth centuries

[77] *Calendar of State Papers, Domestic*, 1581–90, p. 111.

[78] *Cambridge History of English Literature*, IV, 441–42.

[79] We have no record of the printing houses in Paris at this time, but information given by Mellottée (*op. cit.*, pp. 456, 454) concerning the number of booksellers and printers, taken together, suggests that there were probably not more than forty houses.

[80] Mellottée, *op. cit.*, *passim; Inventaire des archives départementales*, Bouches-du-Rhône, B. 3340, fol. 779; B. 3444, fol. 1848.

[81] Mellottée, *op. cit.*, p. 455. Less than eighty of the presses were in continual operation. The others were used casually to print speeches, decrees, poems, etc.

[82] Cf. *Calendar of State Papers, Domestic*, 1581–90, p. 336.

[83] *Cambridge History of English Literature*, IV, 442. [84] *Ibid.*, pp. 467, 441.

in response to the new demand for paper brought by the rapid growth of printing. Until the eighties of the sixteenth century little paper of any kind had been made in England; for it was not until the middle of Elizabeth's reign that the manufacture of paper by means of water-driven mills was permanently established.[85] Before that time paper was being produced in many French provinces—in Provence, Auvergne, Dauphiné, Languedoc, Limousin, Poitou, Anjou, Champagne, and Normandy,[86] as well as in Franche-Comté, which was not yet part of the kingdom.[87] The French manufacturers were anxious to thwart attempts to introduce the continental methods of papermaking into England. According to Richard Tottell, the well-known London printer and stationer who tried to set up a paper mill in the seventies or early eighties, they bought up all the English rags that he needed to get his enterprise under way.[88]

Shortly after Tottell's failure the English papermaking industry was successfully established. At least three mills—one near London, another at Cambridge, and a third at Worcestershire—are said to have been already in operation[89] when shortly before 1588 John Spilman, a naturalized German who had become the queen's jeweler, started his famous paper work at Dartford in Kent, where two great waterwheels, one of which cost some

[85] Rhys Jenkins, "Early Attempts at Paper-Making in England, 1495–1680," *Library Association Record*, II, Part II, 581–85.

[86] Emile Isnard, "Les papeteries de Provence," in Hayem, *Mémoires et documents pour servir à l'histoire du commerce et de l'industrie*, IV, 39; *Inventaire des archives départementales*, Bouches-du-Rhône, B. 3332, fol. 855; Fagniez, *L'économie sociale de la France sous Henri IV* (Paris, 1897), p. 160; H. Blanchet, *Rive et ses environs* (Grenoble, 1861), pp. 34–35; Paul Raveau, *Essai sur la situation économique et l'état social en Poitou* (Paris, 1931), p. 17; G. H. Overend, "Notes upon the Earlier History of the Manufacture of Paper in England," *Huguenot Society of London, Proceedings*, VIII (1905–8), 200.

[87] Jules Gauthier, "L'industrie du papier dans les hautes vallées franc-comtoises du XV^e^ au XVIII^e^ siècles," *Mémoires de la Société d'Emulation de Montbéliard*, XXVI (1897), 41–44.

[88] *Calendar of State Papers, Domestic*, 1581–90, p. 296. According to Duff, Tottell's attempt was made in 1573 (*A Century of the English Book Trade*, p. 157), but his account of the venture in the State Papers has been dated tentatively 1585. At the time of writing it, Tottell still hoped to succeed.

[89] *Calendar of State Papers, Domestic*, 1601–3, pp. 43–44.

£1,400 or £1,500, drove the stamping machinery and the hammers for beating the cloth.[90] The Lord Mayor of London complained in 1601 that Spilman had authorized "great numbers of poor people, especially girls and vagrant women," to range "abroad in every street, begging at men's doors" for the rags to be brought to his mill.[91]

Papermaking increased in importance during the first half of the seventeenth century, and in the reign of Charles I there were at least ten and probably more fairly large mills at work.[92] England was catching up with France in the production of paper as well as in the production of books. But the English mills apparently were used almost exclusively for making the crude, so-called "brown" paper, wanted for wrapping and, to some extent, for blotting. The watermarks on English manuscripts and the pages of English books indicate that the country remained dependent upon imports for its white paper until after the middle of the seventeenth century.[93] Shipments from the chief paper-exporting towns of France—Caen, Morlaix, and La Rochelle—probably increased during the reigns of Henri IV and Louis XIII; for the mills in the north and west of France, a few of which were owned by Englishmen,[94] gained something of a monopoly over the export trade to England as the use there of Italian, Swiss, and German paper diminished.[95] In France in the reign of Louis XIII mills were to be found in almost every province. They were a great many times as numerous as in England. But like French glassworks, French paper mills were generally much smaller than English. Unlike the enterprise of Spilman at Dartford, described in

[90] *Ibid.*, 1581–90, p. 556; Thomas Churchyard, *A Description and Playne Discourse of Paper* (1588), reprinted in John Nichols, *The Progresses of Queen Elizabeth* (1788), Vol. II.

[91] *Calendar of State Papers, Domestic*, 1601–3, pp. 43–44.

[92] Nef, "The Progress of Technology," p. 8.

[93] In 1640 the art of making writing paper was said to be "a new invention not heretofore used in [England]" (*Calendar of State Papers, Domestic*, 1640, p. 226).

[94] A. de Montchrétien, *Traicté de l'œconomie politique* (1615), ed. Funck-Brentano (n.d.), p. 95.

[95] Edward Heawood, "Papers Used in England after 1600," *The Library* (4th ser.), XI (1930–31), 292.

1588 as "a house of some estate,"[96] the little mills near Troyes in Champagne, one of the principal papermaking provinces, were not imposing enough to attract the eyes of travelers. Some of those built at the beginning of the seventeenth century were no bigger than cornmills.[97]

It is not clear which of the two countries had the lead by 1640 in the output of gunpowder and saltpeter, manufactures managed by the Crown in France as in England,[98] or in the output of soap and starch. But the beginnings of rapid progress in the manufacture of these commodities go back, as is true of printing and papermaking, to an earlier period in France than in England. This may be illustrated by the history of soap-making in Provence, which was a great center for supplying the rest of France. The manufacture was definitely established there in the last half of the fifteenth century—at Toulon, Hyères, and Marseilles. By 1525 there were at least two factories in operation at Marseilles and probably more before 1540.[99] By that time the industry was clearly well on its feet. It grew at Marseilles during the second half of the sixteenth century,[100] but this growth appears to have been caused partly by a concentration of the manufacture at the expense of soap-making in other provençal towns. There was some development of the industry in Languedoc in the time of Henri IV. Two small factories were started at Gignac, near Montpellier, one in 1602, the other in 1609.[101]

We do not know how much soap was produced at Marseilles in Louis XIII's reign, but the output seems to have been less than that of London, where the English manufacture tended to concentrate.[102] In 1669, when production at Marseilles had apparently declined somewhat since 1640, the town had seven factories,

[96] Churchyard, *loc. cit.*

[97] *Inventaire des archives départementales*, Aube, E. 366. The same was apparently true of the mills in Picardy (*Inventaire des archives départementales*, Aisne, H. 67).

[98] See, e.g., Archives de l'Aisne, B. 503, B. 3545; *Inventaire des archives départementales*, Bouches-du-Rhône, B. 3553, fol. 165.

[99] *Encyclopédie départementale. Les Bouches-du-Rhône*, III, 168; L. Barthélemy, *La savonnerie marseillaise* (reprint from *La Revue de Marseille*) (Marseilles, 1883), pp. 9–10, 12, 20.

[100] *Ibid.*, p. 22. [101] *Inventaire des archives départementales*, Hérault, C. 2660.

[102] See above, p. 653.

most of them with more and probably larger boilers than those started before 1540.[103] Four of the factories were in operation, and the recorded shipments of Marseilles soap to western, central, and northern France, mainly by way of the Rhone, amounted to about 1,310 tons.[104]

By the reign of Charles I the new manufactures, taken together, almost certainly employed a larger number of hands relative to the total population in England than in France. The great lead obtained by the English in alum-making, brewing, tobacco-rolling, and pipe-making much more than offset their disadvantage in printing and papermaking. And in France the progress of the new manufactures had been spread over two centuries, while in England it had almost all been crowded into the hundred years following the dissolution of the monasteries.

X. CONCLUSION

This comparison of industrial growth in France and England makes no pretense at completeness. It is the merest sketch. A number of industries like tanning, the manufacture of earthenware, and sugar-refining have been altogether omitted; others like textiles, building, and the manufacture of starch have not been at all adequately treated. Further study, especially among the manuscripts in the national and local archives of both countries, is bound to reveal a wealth of further details concerning the growth of every industry.

What we know already is sufficient, nevertheless, to bring out great differences between development in the two countries. In France there was no sharp break with the past in so far as industrial growth was concerned. New industries were introduced, and the output of old industries increased. But that had been true in previous centuries. There was no wholesale introduction of new

[103] *Encyclopédie départementale*, III, 195.

[104] Archives Nationales, F[12] 1834[A]. The figure given in the document is 2,714,950 *livres*. I have converted this into tons on the assumption that the livre was 0.49 kg. (see Part II, n. 59). It is possible that the designation *savon de Marseille* included soap made in other provençal towns besides Marseilles. But that is not necessarily the case; for the record also includes imports of *savon blanc*, most of which, like Marseilles soap, came up the Rhone. This *savon blanc* may have been manufactured in Provence, but it may have come from abroad. In 1669, the imports of *savon blanc* amounted to 914,619 *livres*, or about 440 tons.

manufactures, no unprecedented growth in the volume of salt, glass, ships, coal, iron, metal wares, and building materials produced, such as led most English traders during Shakespeare's lifetime to expect a doubling almost every decade in the commodities they bought and sold. The output of coal, iron, glass, and many other products continued to increase, especially in central France, around Lyons and along the Loire, and in the lower Rhone valley, even during the religious wars from 1560 to 1593. But this period was marked by a general slowing down of industrial progress. Nor was the rate of growth in the volume of production during the half century following the religious wars more rapid than it had been in the late fifteenth and early sixteenth centuries. In some regions—such as Poitou, Champagne, and Provence—the reign of Louis XIII proved an even less favorable period for industrial development than the more troubled reigns of Charles IX and Henri III. The hundred years which ended in 1640 appear to have been an age of somewhat slower growth in industrial output than the hundred years which preceded them.

In England they were marked by a phenomenal speeding up of production. A large number of new manufactures flourished for the first time. The output of the older industries, except tin-making, multiplied four-, five-, or sixfold and in at least one case eight- or tenfold. The rate of growth in production was most rapid during the last three or four decades of the sixteenth century and the first two of the seventeenth, when it was nearly, if not quite, comparable to that at the end of the eighteenth and the beginning of the nineteenth centuries.

Before the dissolution of the monasteries England was industrially in a backwater compared with the chief continental countries, especially northern Italy, southern Germany, and the Belgian provinces. While England already produced more coal, tin, and lead, and more woolen cloth relative to her population, than France, she was far behind in the output of nearly all other industrial products. The phenomenal growth in mining and manufacturing in England during the next hundred years changed the economic map of Europe. Foreigners who visited London in the reign of Charles I were astonished by the coal smoke from tens of thousands of domestic fires and from hundreds of small factories

and workshops. To them the city with its breweries, its soap and starch houses, its brick kilns, sugar refineries, earthenware works, and glass furnaces seemed hardly fit for human habitation. There were plenty of Londoners who agreed with them. In 1627 a complaint was brought "full cry" to the Privy Council that an alum house near the Tower caused great annoyance to the inhabitants within a mile compass. The "loathesome vapour" from the factory was said to poison the very fish in the Thames, and an appeal was made to the College of Physicians to pronounce the vapor damaging to the health of the citizens.[105] But in spite of innumerable protests of this kind[106] the factories grew rapidly in number. London had taken her place in Charles I's reign as the leading industrial city of the world.

By that time the volume of industrial output, relative to population, had almost certainly become much larger in England than in France. England had gained an enormous absolute advantage in the production of coal, alum, and beer. She was producing more ships, much more tobacco, and many more tobacco pipes. Her leadership in the production of cloth and lead had probably increased. She was now also manufacturing, relative to her population, a much larger volume of iron, copper, and brass, of finished metal commodities, and of building materials—such as bricks and lime—than were produced in France. She had drawn abreast of France in the production of common glass. She had reduced the lead which France had held before the Reformation in the output of salt, paper, and printed matter. It was only in the making of wares which the very wealthy alone could afford to acquire—such as lace, silks, and tapestries, and works of art modeled in glass, metal, clay, and stone—that the French increased the advantage they had always had over the English. Artistic craftsmanship consolidated a position in France which it had inherited from the age of Gothic cathedrals and the age of Italian Renaissance art, at a time when Englishmen were coming to be primarily interested in inventions designed to lower costs of production and increase output.

The phenomenal growth of industrial output in England played

[105] *Calendar of State Papers, Domestic*, 1627–28, pp. 269–70.

[106] Cf. Nef, *Rise of the Coal Industry*, I, 157.

an important part in the early English "industrial revolution." In the present sketch we are concerned only with its relation to the progress of those establishments built specially or remodeled extensively for carrying on industry. Some of the new manufactures, like the making of alum and copperas, were carried on altogether in such small factories, and others, like gunpowder-making and brewing (at least in London), lent themselves readily to large-scale production. The growth in the demand for salt and for window panes and bottles helped make it profitable to replace the small boilers and ovens, heretofore in use, by great pans and furnaces costing hundreds of pounds. The salt pans could frequently be grouped to advantage in large establishments owned by partnerships of rich merchants, who found in these new ventures a convenient means of investing their growing wealth. The increase in the demand for coal and ores exhausted the surface supplies of both and forced the miners to "rake" their livelihood at depths of from one hundred to four hundred feet, where the cost of sinking shafts, draining off water, and ventilating the workings made large-scale enterprise inevitable. Thus the rapid expansion of industrial output helps us to understand why in England the workpeople who labored in mines or small factories could already be counted on the eve of the Civil War by several tens of thousands.[107]

In France, where industrial growth from 1540 to 1640 was so much slower than in England, there could have been no such pull in the direction of large-scale enterprise. The divergences between English and French development were widest during these hundred years in the industries which lent themselves most readily to production in capitalistic plants. It was in mining and metallurgy, shipbuilding, brewing, alum- and copperas-making that England had established the greatest lead over France by the reign of Charles I.

Among the manufactures whose output was still notably greater, relative to population, in France than in England, printing and possibly papermaking were the only ones in which something approaching the factory form of enterprise became common. And, measured by the number of workpeople engaged, printing and

[107] Nef, "The Progress of Technology," p. 22.

papermaking were of small importance in France during the reign of Louis XIII compared with mining and metallurgy in England.[108] Thanks to the bounty of nature the production of French salt, which employed a large number of hands, continued to be carried on by local peasants without the introduction of costly metal pans and supplies of fuel which in England caused the downfall of the small independent producer. In seventeenth-century France the relation of the salters to the owners of the salt marshes resembled that of landholding tenants to their manorial lords rather than that of factory wage-earners to their capitalist employers. Thanks, also, largely to natural conditions wine-making, unlike beer-brewing, remained a part of the manorial economy. While in England and the Belgian provinces the hops and malt were carried long distances to the brewers in the chief towns, where a concentration of the manufacture became possible, in France the grapes were invariably crushed, generally by very primitive and inexpensive methods, near the spot where they were grown.

To reach a final conclusion concerning the relative progress of industrial capitalism in France and England from 1540 to 1640 it will be necessary to compare the course of technological changes and the relations of the Crown to industrial enterprise in the two countries. But our comparison of the growth in mining and manufacturing is sufficient to show that the development of capitalist enterprise could not have been phenomenally rapid in France as it was in England. Professor Ashley has told us that Arnold Toynbee used the word "Revolution" to mean a rapid and sweeping phase of "Evolution."[109] No "industrial revolution," in that

[108] There were 183 presses in Paris in 1645, hardly half of which were in constant use (Mellottée, *op. cit.*, p. 455). Apparently each press required the labor of from five to eight persons (Hauser, *op. cit.*, p. 240), and, in addition, each printing house, of which there were seventy-six, had its type-setters. This suggests that something like 1,500 workpeople labored for the Paris printers. The number in the provinces is quite uncertain, but there were probably not more than 3,000 or 4,000 at the outside. England, a country with hardly a third the population of France, already had some 8,000 workpeople engaged in coal mining alone (cf. Nef, *Rise of the Coal Industry*, II, 138–40). Ore mining doubtless employed several thousands more.

[109] Henry Hamilton, *The English Brass and Copper Industries to 1800* (London, 1926), p. ix.

sense, occurred in France to match the one that was taking place across the Channel.

There was little in French industrial history to promote the expansionist frame of mind, which was already expressing itself in the political activity and much of the literature of Elizabethan England. The belief that the benefits which material progress could confer were of primary importance to human welfare—a belief destined to become almost a creed of Western civilization in the nineteenth century—had already made itself felt more in the works of Francis Bacon than in those of his continental contemporaries. Frenchmen generally were finding it more difficult than Englishmen to abandon the philosophy of the medieval schoolmen, which was not sympathetic to the progress of natural science and technical invention. Descartes discovered his spiritual home in the Holland of Rembrandt and Spinoza, a country scarcely less expansionist on the industrial side than England. And if Montaigne took up a position of complete skepticism, the doubts that he felt for the religious beliefs of the medieval Christian church were less profound than those which he expressed for the attempts of men to increase their happiness by material sophistication.[110] No one in England answered Bacon in terms as "medieval" as those used by Pascal in answering both Descartes and Montaigne.

The contrasts between industrial development in France and England in the late sixteenth and early seventeenth centuries were reflected even in branches of history remote from economic. Investigation will probably show that they were reflected in the whole fabric of contemporary civilization. The contrasts seem to have been even greater in the age of Montaigne and Bacon than in the age of Buffon and Watt. In the later age the expansionist frame of mind had begun to influence the texture even of French civilization. The Industrial Revolution of the late eighteenth and early nineteenth centuries only increased a lead that England had long held in the volume of industrial output and the progress of industrial capitalism. That lead had been established two centuries before by an earlier industrial revolution.

[110] Cf. his celebrated "Apologie de Raimond Sebond."

MR. KEYNES ON UNDEREMPLOYMENT EQUILIBRIUM[1]

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MR. KEYNES regards his new book[2] as the fulfilment of the imperfect, though essentially correct, views of "Mandeville, Malthus, Gesell and Hobson"—majors in the "brave army of heretics . . . . who, following their intuitions have preferred to see the truth obscurely and imperfectly rather than to maintain error reached, indeed, with clearness and consistency and by easy logic, but on hypotheses inappropriate to the facts."[3]

Mr. Keynes announces in the first chapter of his book that it is his purpose to contrast his arguments and conclusions with those of the *classical* economists, by which he means Ricardo, Mill, Marshall, Edgeworth, and Pigou. He confesses in his Preface that the orthodox economist will probably fluctuate between the belief that his new book is quite wrong and the belief that it contains nothing new. For himself, however, the author feels that the composition of this book has been a long struggle of escape

[1] I wish to express appreciation of many stimulating discussions with Dr. Tord Palander of the University of Stockholm, and with Dr. Eugen Altschul and Mr. B. H. Higgins of the University of Minnesota.

[2] *The General Theory of Employment, Interest and Money.* New York: Harcourt, Brace & Co., 1936. Pp. xii+403. $2.00.

[3] Keynes's new work is especially inspired by Malthus. In connection with his current appreciation of the work of John A. Hobson (only slightly in evidence in the *Treatise* of six years ago) it is not without interest to turn back to a review of Hobson's *Gold, Prices and Wages* (*Economic Journal*, September, 1913, pp. 393–98) written twenty-three years ago. In this review Mr. Keynes says: "One comes to a new book by Mr. Hobson with mixed feelings, in hope of stimulating ideas and of some fruitful criticisms of orthodoxy from an independent and individual standpoint, but expectant also of much sophistry, misunderstanding, and perverse thought. . . . . The book is . . . . made much worse than a really stupid book could be, by exactly those characteristics of cleverness and intermittent reasonableness which have borne good fruit in the past." This characterization by Mr. Keynes himself is not altogether inapplicable, some will perhaps say, to his own book.

from habitual modes of thought and expression, and "so must the reading of it be for most readers if the author's assault upon them is to be successful." The difficulty, he says, lies not in the new ideas, which even though laboriously expressed are in reality extremely simple, but rather in the fact that the old ideas, on which we have all been brought up, ramify into every corner of our minds and keep us chained in fetters.

The reader who is familiar with the earlier work published six years ago, the *Treatise on Money*, is likely at first to be somewhat bewildered upon taking up this new book. Yet Mr. Keynes explains that what to others may appear as a confusing change of view seems to him to be a perfectly natural evolution in the line of thought which he has been pursuing for several years. With this interpretation the present reviewer finds himself quite sympathetic. For, while Mr. Keynes has now donned an entirely new suit of clothes, it is not difficult to see that it is, after all, the same man who wears them.

The imposing edifice erected in a *Treatise on Money* is, indeed, wholly abandoned. It had been shown that there was a serious error in his first fundamental equation.[4] The correctness of this criticism Keynes at once admitted,[5] and announced that in future editions of his book he would redefine the units in which the physical quantities were measured so as to correct this error. It was then pointed out that, were this done, his second fundamental equation would thereby equally be rendered of no practical significance.[6] Still more disconcerting was the conclusive demonstration by Hawtrey and Robertson that the disequilibrium between investment and saving as Keynes defined them was incapable of revealing the causal factors at work. It was shown that the inequality of saving and investment, as defined, merely reflected and registered the course of events; that this divergence could not be regarded as the "cause of a windfall loss or gain, for it *is* the

[4] Alvin H. Hansen, "A Fundamental Error in Keynes' *Treatise on Money*," *American Economic Review*, September, 1932.

[5] *American Economic Review*, December, 1932.

[6] Alvin H. Hansen and Herbert Tout, "Investment and Saving in the Business Cycle," *Econometrica*, April, 1933.

windfall loss or gain."[7] These and other criticisms left his theoretical structure without a foundation and compelled either an abandonment or a radical reconstruction.

The critics may well, however, be wary of assuming too much credit for the author's abandonment of the edifice so elaborately constructed only six years ago. For Mr. Keynes is one of those rare and delightful spirits who finds it quite impossible to live happily for long in contemplation of old ideas, even though those ideas are his own. He must forever be exploring new frontiers and evolving new insights and new solutions. It is this characteristic which makes Mr. Keynes one of those phenomena in our current age which helps to make life worth living. *The General Theory of Employment, Interest and Money* is no less stimulating than was the *Treatise on Money*.

The new book is not a treatise; it is a debate to which the public is invited, and the ticket is five shillings in England and two dollars in the United States. The publication of a book with so difficult and complicated an analysis at a best-seller price is itself indicative of the power and prestige of Mr. Keynes as a social prophet in the current distracted world. The shafts are directed, as the author himself announces, at the classical school from Ricardo to Pigou, but in the midst of this major contest Mr. Keynes finds ample strength for many a dart at the neo-Viennese and London school.

And what is the debate about? Very briefly it may be stated as follows: Ricardo had built up quite logically and consistently a theory of prices and distribution based on the assumption of an equilibrium position at which the factors of production were fully employed. It is Keynes's purpose, however, to develop—what he thinks the classicals had neglected—the general theory of employment. He criticizes the classical school, not for their analysis of the manner in which the factors of production are combined or of how the value of the final product is distributed between them, but because they neglected to consider the determinants of the volume of employment and output as a whole. They assumed

[7] R. G. Hawtrey, *The Art of Central Banking* (1932), p. 349; and D. H. Robertson, *Economic Journal*, September, 1931.

that there was but one equilibrium position—that of full employment. Keynes argues that this position is but a limiting point of a whole range of possible positions of equilibrium. It is the essential function, indeed, of his new book to show that in the actual conditions of the current economic order equilibrium is reached at a point far below full employment, and to elucidate the factors which determine at what level any one equilibrium position is reached. What is criticized, therefore, is not the theory of prices and distribution of the classical school, but the assumption that there is only one equilibrium point, and in particular the disastrous and misleading attempt to apply the characteristics of the special case of equilibrium at full employment to the quite different facts of experience in the economic society in which we actually live.

What is correct policy in the case of equilibrium at full employment may turn out to be quite a wrong policy in an equilibrium position at underemployment. At full-employment equilibrium one is concerned only with the proper allocation of the factors in the production of consumption goods and of investment goods. One is not concerned with the problem of full employment of these factors, since that is assumed. Under these conditions consumption and investment stand in a competitive relation to each other. If investment is increased, consumption must perforce be reduced, and vice versa. In such a society the question of how much to save and how much to consume involves exclusively the problem of future satisfaction of wants as against present satisfaction of wants. Increased investment may, under these circumstances, be justified as a means of increasing future production. Neither investment nor consumption has any relation to the problem of employment as such, since full employment is assumed regardless of the ratio of consumption to income. But if the society is at equilibrium at a point of underemployment the matter is quite different. Under these circumstances consumption and investment stand not in a competitive relation but in a complementary relation to each other. With underemployment, an increase of investment, far from requiring a restriction of consumption, will, because of the resulting increase in employment and

income, tend to increase consumption. Likewise an increase in consumption (i.e., an increase in the percentage of the income consumed) will raise the prospective profitableness of investment. Thus both consumption and investment are simultaneously increased and thereby also, employment, output, and income. While a puritanical policy of thrift and saving may be quite appropriate in a society in equilibrium at full employment, prodigality may be the appropriate social virtue in a society in equilibrium at underemployment.

It is evident that the great problem for a society in equilibrium at underemployment is to bring under social control the determinants of equilibrium. Only in this manner can the position of equilibrium at full employment be achieved. What now are these determinants? They are: (1) the propensity to consume, (2) the schedule of marginal efficiency of capital,[8] and (3) the complex of rates of interest on loans. These are the determinants of the volume of consumption and of investment, which in turn fix the volume of output, income, and employment for society as a whole.

The ultimate causal forces are therefore found outside of the price system, in the mores, customs, habits, and behavior patterns of the people. The fundamental psychological factors are the psychological propensity to consume, the psychological expectation of future yield from capital assets, and the psychological attitude to liquidity. Psychological propensities, mores, and behavior patterns are thus the root forces which lie back of and control consumption and investment and thereby determine what the point of equilibrium shall be.

In this connection let it be noted that when modern capitalism was in process of developing, and when it was in full bloom, it did not rely solely on the automatic functioning of the price system to supply an adequate volume of saving. It preached the doctrine of thrift and sought to establish a propensity to save.

[8] Keynes alleges that current business-cycle theory fails to see that the marginal efficiency of capital depends on the prospective yield of capital (pp. 141, 145–46). In this he is, however, definitely in error. See, for example, chaps. iv and vi (esp. pp. 82–86 and 134–35) in my *Business-Cycle Theory* (1927), where a survey is given of writers who analyze the cycle phenomenon in terms of "fluctuations of the marginal efficiency of capital relatively to the rate of interest."

On the classical assumption of full employment one need have no concern about the propensity to consume, for what was not consumed was saved. And saving merely meant a diversion of production toward the creation of investment goods. The rate of interest was the regulator which controlled the ratio of consumption to income. If the rate of interest fell, less was saved and a larger percentage of the income was consumed. If the rate of interest rose, more was saved and less was consumed. Thus in the earlier view the supply curve for savings assumed the familiar, normal shape. Later to be sure, this definite inverse correlation between the rate of interest and saving was subjected to criticism. In neo-classical thinking doubt had been raised with respect to the precise relationship between the rate of interest and saving. Within certain limits, indeed, a lower rate of interest might induce a larger volume of saving. All this is familiar ground, and needs no elaboration here. It was held, nevertheless, that while a fall in the rate of interest up to a certain point might indeed stimulate saving, below a certain minimum level any further decline would reduce the volume of saving and stimulate consumption. Cassel in his *Nature and Necessity of Interest* had argued that, because of the shortness of human life, capital depletion would set in, once interest fell below a certain point. Below this minimum rate consumption would be stimulated at the expense of saving.

Thus, while neo-classical thought refused to accept the doctrine of an invariant relation between interest and saving, it did not go so far as to break completely the dependence of saving upon the rate of interest offered in the market. While under modern high standards of living it had come to be believed that the growth of population had little relation to the rate of wages, it was only within certain limits that the same position was taken with respect to the supply of capital as a variable independent of price. The view of Hobson—that saving had no relation to the interest rate, that it was determined wholly by the mores, customs, and behavior patterns of the population, by the propensity to consume and its inverse, the propensity to save—remained the unorthodox view.

With Keynes (as with Cassel, but for quite different reasons)

there is a minimum rate of interest below which—unless, indeed, determined action is taken by society—the rate of interest cannot fall. He suggests that this minimum rate is 2 or 2½ per cent. But with Keynes, despite this minimum rate, society (because of a fixed propensity to consume only a limited proportion of its income) continues to pour out a steady flow of savings. Thus the marginal efficiency of capital may well fall to a point below the minimum rate of interest. Here, then, is to be found the mechanism which drives the economic system to an equilibrium level below the point of full employment. According to Keynes, at this minimum rate of interest saving is not deflected toward consumption, as Cassel had it; instead, it is at this point that hoarding begins. If saving continues willy-nilly by reason of a fixed psychological propensity without regard to price factors, and if the marginal efficiency of capital in a wealthy community falls below the minimum interest rate, then of necessity a part of the planned individual savings cannot find outlet in realized investment.

At this point it becomes necessary to inject a brief consideration of terminological difficulties. In the new book Keynes formally abandons his former highly artificial definitions of income and saving.[9] But his new terminology is by no means wholly satisfactory. In the reviewer's opinion his entire exposition would have been very greatly facilitated had he adopted outright Robertson's definitions of income, saving, and investment.[10] This would have made it far easier for him to make clear the factors of disequilibrium. For Robertson's terminology enables one to see very clearly the disequilibrating effects of hoarding and dishoarding and of credit creation and debt cancellation. In Robertson's view the saving of the current period is equal to the income of the preceding period minus the consumption of the current period. The

[9] According to these definitions, income included the "normal" return of entrepreneurs. In calculating the income of entrepreneurs no account was taken of windfall profits or windfall losses. Thus in a depression, despite windfall losses, the income of entrepreneurs, as defined, remained unaffected. And, since saving was defined as that part of income which was not spent on liquid consumer's goods, it followed that a large part of the saving in a depression consisted of business losses!

[10] D. H. Robertson, "Saving and Hoarding," *Economic Journal*, September and December, 1933.

consumption of today may, however, exceed the income of yesterday by the net addition of a certain amount of dishoarding or of credit creation, and vice versa. Thus Robertson speaks of "the power possessed by the public and by the monetary authority to alter the rates of income flow—the former by putting money into and out of store, the latter by putting it into and out of existence."

The current income is determined by the volume of consumption and investment of today. If the consumption and investment of the current period exceed the income of the preceding period, expansion of employment and of income occur. If, on the other hand, current consumption and investment fall below the level of the income of the preceding period, contraction is going on. In this latter case a portion of the current savings finds no outlet either in consumption or in investment, and so "runs to waste." The excess of saving over investment is the measure of the idle funds, or "hoards."

Robertson's terminology does not mean that the current consumption is limited and restricted by the income of the preceding period, as Hawtrey has alleged.[11] The current consumption and investment is largely determined by anticipations of the future, by the state of optimism or pessimism. If the outlook is good, if the prospective rate of profit is high, investment will be increased. If one anticipates a rising income one will plan a larger consumption. The current consumption and investment may, therefore, outrun the volume of the income of the preceding period partly by dishoarding[12] and partly by the use of credit. It is in just these anticipations and the plans that follow them that the dynamics of disequilibrium must be sought. It is because of these factors that saving and investment, as Robertson defines them, may be in disequilibrium and may therefore involve either expansion or contraction.[13]

[11] R. G. Hawtrey, "Saving and Hoarding," *ibid.*, December, 1933.

[12] "Hoarding (Dishoarding) may be alternatively defined as acting in such a way as to decrease (increase) the velocity of circulation of money against output" (D. H. Robertson, "Saving and Hoarding," *ibid.*, p. 401).

[13] Let Y_0 = the income of the preceding period; Y_1 = the income of the current period; C_1 = the consumption of the current period; S_1 = the saving of the current period; and I_1 = the investment of the current period. Then $S_1 = Y_0 - C_1$ or $Y_0 = C_1 + S_1$; and $Y_1 = C_1 + I_1$. Therefore $Y_1 - Y_0 = I_1 - S_1$.

Keynes, refusing to adopt this terminology, is hard put to it to find a satisfactory scheme of exposition. One is never clear precisely what his terminology means. He defines saving and investment as always equal. In terms of the real phenomena, obviously saving must always equal investment; but in terms of the receipt and disposition of money funds, such a terminology makes it very difficult to handle satisfactorily the important concepts of hoarding and dishoarding, credit creation and debt cancellation. In a cumbersome manner Keynes in fact obviates the difficulty by explaining that individuals may strive to save a certain given amount, but this attempt is bound to fail if the volume of realized investment falls below the planned saving. Thus he finds his disequilibrium between planned individual saving[14] and realized investment. "The decisions to consume and the decisions to invest between them determine incomes." If planned saving exceeds realized investment the income of the community is driven down to a point at which the planned saving and the realized investment equate. If planned saving and realized investment equate, there would be no tendency toward any further change in income and employment. Thus equilibrium is reached only when the propensity to consume and the inducement to invest stand in a particular relationship to one another.

It is, moreover, difficult to be sure precisely how Keynes would measure quantitatively the propensity to consume. Is it the ratio of anticipated consumption to anticipated income, or is it the ratio of the planned consumption of the current period to the realized income of the preceding period?[15] If it is the former, then, indeed, the propensity to consume might remain very nearly constant, regardless of fluctuations in optimism and pessimism, and in this event one might speak, as Keynes at times does, of a more or less fixed consumption behavior pattern—a fixed propensity to consume.[16] If, however, it is the latter, then the propensity to consume would fluctuate violently with waves of pessimism and

[14] See pp. 83–84, 211.

[15] A third possibility would be the ratio of realized consumption to realized income.

[16] This statement is not altogether true, since Keynes's "anticipated income" does not adequately take account of anticipated increases in the market values of capital assets (see p. 56).

optimism. At times he speaks as though this were the case, for he says that if the community is optimistic about a rapid rise in income (in consequence, let us say, of prospective windfall profits in the speculative market) then the propensity to consume rises. In the latter event, the propensity to consume might rise above unity, since current consumption might easily exceed the realized income of the preceding period. All these difficulties and obscurities arise from Keynes's failure to give exact definitions and to employ them consistently. While terminological difficulties are more successfully handled in this book than in the *Treatise*, the treatment is nevertheless by no means satisfactory.[17]

Returning to the main argument, why, according to Keynes, does not the continued pressure of savings force the rate of interest[18] down below the marginal efficiency of capital? The answer is that the loan rate is not merely a pure interest rate; it includes also the cost and risk of lending. Thus, if one assumes that the pure rate were driven to zero, and that the cost and risk of lending were 2 per cent, it is clear that the minimum rate could never fall—so long as there is the alternative of hoarding—below this 2 per cent. In addition there is the special risk (a risk which becomes greater the lower the rate received) that any slight rise in the rate of interest in the future will drive the capitalized value of the investment down to a point at which the entire interest earnings have been wiped out. At the present moment, with the very low yield on long-term government bonds, a slight rise in the rate of interest would cause an appreciable loss on the principal. This is the danger which banks now run in holding long-term government bonds and which causes them, in large part, to prefer complete liquidity. Thus, below a certain interest rate, complete liquidity is deemed preferable to investment. The rate

[17] See pp. 27–29, 50–51, 61–64, 90–98, 110–12, 261.

[18] With respect to Keynes's criticism (chap. xiv) of the neo-classical treatment of the theory of interest, it should be noted that circular reasoning (such as he here attacks) can be found in all partial analyses of isolated factors in which it is necessarily assumed that "other things remain equal." One can get out of the circle only by the method of the general equilibrium analysis. Moreover, his own interest theory is wholly inadequate, since it leaves out of account the most important variable, the marginal efficiency of capital.

of interest, therefore, fails to fall to the point to which it would have to be driven in order that the whole flow of planned savings might find a ready outlet in investment. Taking, therefore, the propensity to hoard (liquidity preference) in conjunction with the relatively constant propensity to save, it is discovered that the rate of interest does not equilibrate the volume of planned individual saving and realized investment. In consequence, a part of the available purchasing power in the community finds no outlet in the market. Unemployment, reduced output, and declining income ensue until a level of impoverishment is reached at which the propensity to consume is increased sufficiently so that the flow of planned individual saving equates with the volume of realized investment. For, with a higher ratio of consumption to income, the marginal efficiency of capital now rises to the level of the rate of interest. At this point an equilibrium is reached. The rate of interest now equates with the marginal efficiency of capital, and planned individual saving with realized investment. But this point of equilibrium is one at which there is underemployment of the factors of production. Until there is a change: (1) in the propensity to consume, (2) in the marginal efficiency of capital, or (3) in the rate of interest, this equilibrium position remains fixed.

By what policies might the industrial system be shoved off this dead center of underemployment equilibrium? Keynes considers, in this connection, the rôle of wages, the rôle of money, the rôle of income distribution, and the rôle of socially controlled investment.

Keynes does not deny (as doubtless many superficial readers will conclude) the possible efficacy of reduction in wage rates as a means of lifting the economic system to a higher equilibrium position at fuller employment. He admits that a reduction in wage rates would release a proportion of the money supply and tend to lower the rate of interest. But he holds that there are other ways in which this same end could be accomplished without the social cost of wage reduction, and that it is therefore folly to resort to this method. Keynes admits, moreover, that a general systematic scheme of wage reduction, carried out by a highly integrated or

authoritarian society, might prove effective in raising the marginal efficiency of capital. But in Western democracies this method is not applicable—wage reductions, in fact, come piecemeal, now in this industry and now in that. The effect of such wage reductions upon political confidence and popular discontent might be to raise materially the schedule of liquidity preference. Moreover, if the reduction in wage rates leads to the expectation of a further wage reduction in the future the effect on current investment is likely to be unfavorable. In addition the transfer of income from wage-earners to other factors is likely to diminish the propensity to consume. For these reasons, piecemeal reductions, which leave the future uncertain, are not likely to prove an effective method of increasing employment. Wage reduction, moreover, tends to load the whole weight of any existing maladjustment upon the single factor, labor, and this is surely inequitable. Finally, the wasteful and disastrous struggles, to which this method almost certainly gives rise, threaten the whole social fabric and make it an impracticable device in the modern world. If the wage level is too high, other methods must be found of increasing the marginal efficiency of capital to a point at which equilibrium at full employment may be reached.

With respect to Pigou's theory of unemployment Keynes does not disagree with the static relationship which Pigou finds between the rate of real wages and the volume of employment. What he does charge (surely without justification) is the failure of Pigou to analyze the dynamic factors which control the rate of real wages, especially the factors—the marginal efficiency of capital and the rate of interest—which control the volume of investment.

Everything considered, a flexible wage policy as an instrument of control is ruled out as dangerous—and, indeed, it is argued that, under the institutional arrangements of Western democracies, genuine stability can better be achieved by an inflexible wage policy. Other methods of control must be discovered to secure full employment.

To this end, money plays for Keynes an important rôle, although less important in this book than in the *Treatise*. A con-

trolled rate of interest, relentlessly held at a point below the marginal efficiency of capital and driven still lower as marginal efficiency falls with fuller investment, might eventually achieve—possibly even within a generation—the condition of completely "full investment." This means that the supply of capital would have been increased to a point at which it would yield no net return over its replacement cost. At this point, the *rentier* class would be eliminated, and capital as a factor in production would have made its full contribution to maximum output.

A difficulty with this method—and one which Keynes sees—is that if full employment were reached prior to the point of full investment inflation would set in. To prevent inflation the rate of interest would have to be raised to the level of the marginal efficiency of capital. But if equilibrium at full employment were reached short of full investment, and if the society really wished to achieve a condition of full investment, resort would have to be made to other methods, such as direct social control of the volume of investment.

If a controlled rate of interest should prove quickly effective in achieving full employment, and if this policy were joined with a policy of taxation designed to bring about more equal income distribution, it might turn out that the rate of accumulation would be even lower than in the existing society. This would place us even farther than now from the condition of full investment. Should it therefore turn out to be an easy matter to achieve full employment by means of a controlled interest rate it might not be desirable, Keynes thinks, to increase the propensity to consume. For, at full-employment equilibrium, consumption becomes competitive with investment, and this would prevent the society from moving toward that level of productivity which full investment would make possible.

The relentless maintenance of a sufficiently low rate of interest to maintain full employment, Keynes points out, is unattainable in an international gold-standard system. For if you must defend your balance of payments against gold drains by raising the rate of interest you thereby sacrifice the goal of full employment. Thus

the rigorous maintenance of an adequately low interest rate involves the adoption of a policy of flexible exchange rates.

In Keynes's view the condition of underemployment equilibrium will inevitably persist indefinitely in modern societies unless drastic measures are taken to control the determinants of employment—namely, the propensity to consume, the marginal efficiency of capital, and the rate of interest. Is this position tenable? Is it true that the condition of underemployment equilibrium (without action such as that indicated above) is stable? I do not think it is, unless one introduces certain definite assumptions which Keynes does not do.

There is one necessary condition, in my view, without which stable underemployment equilibrium is not possible. It is the condition of cost rigidity (including wage rates) and monopolistic control of supplies. And this situation is made much worse should it turn out that we are approaching a society in which the outlets for investment are likely to prove more limited than in the past century.

The current orthodox theory—represented, for example, by Pigou—has so fully elaborated the theory of underemployment equilibrium, under conditions of cost rigidity and monopolistic control of supply, that it is only necessary here to make reference thereto. We can be reasonably certain that these restrictive institutional factors and rigidities will continue to prevail to a sufficient degree in the decades ahead to produce a very considerable amount of unemployment apart from the normal cyclical fluctuations. It will, therefore, be quite impossible from a mere observation of the course of future events to determine whether or not Keynes's analysis is valid.

With respect to economic progress, the rapid development of new products, new processes of production, new ways of utilizing natural resources, and new combinations of the productive factors have the effect of raising the marginal efficiency of capital and thereby stimulating investment. Thus economic progress constantly tends toward equilibrium at full employment. Should it turn out, however, that the next decades will witness a relative stagnation in innovations in the utilization of the resources of

nature, the marginal efficiency of capital may (in view of existing and prospective cost rigidities) fall to a point so low as to produce a stagnation in investment.[19] In the past enormous investments have been made in large capital-consuming developments, such as railroads, roads, and other public utilities. It is not impossible that the technological innovations of the future will be of a character that will require less capital than many of the developments of the last century. Moreover, certain types of technological innovations are definitely capital economizing rather than capital using.

The frontier for the entire world is largely gone and population is approaching stabilization—if not, indeed, decline.[20] This affects the outlet for the investment in durable goods both at home and abroad. Rural electrification schemes, housing projects, and the like, carried out under the stimulation of low interest rates, may, however, turn out to be really important investment outlets.

In view of the prevailing (and probably increasing) cost rigidities, and in view of the possibility of a slowing down in capital-consuming technological innovations, the problem of structural, or secular, unemployment (altogether apart from the cyclical unemployment of ordinary industrial fluctuations) is almost certain to present itself for solution in the decades before us. The all-

[19] Unemployment and stagnation, moreover, foment psychological conditions which intensify the international strain and threaten world-chaos.

[20] "And if some approach to an even rate of growth was attained in the nineteenth century, when both population and the area of effective economic intercourse were rapidly increasing, it may turn out (paradoxically enough) to be harder to attain in a planet which, thanks to the activities of the prospector and the pioneer and to the success of the propagandists of birth control, is rapidly ceasing to be a worthy member of an expanding universe."

"[Thus] it seems evident that the ship of economic life may be set a problem in re-orientation which transcends the capacities alike of its navigators and of its monetary steering-gear. Under such conditions the popular instinct which finds the root cause of dislocation in undigested plenty may be a surer guide than the laborious but one-eyed analysis which finds it in flouted scarcities and unjustified rigidities. . . . . But again, if private enterprise remains sovereign, can it, at its most successful, find any way of countering slumps save by the perpetual stimulation of increasingly meretricious wants and increasingly hectic habits of life? Can it, consistently with its own nature, succeed in the more subtle task of transmuting into diffused leisure the concentrated unemployment of today?" (D. H. Robertson, *Stand der Konjunkturforschung* [Festschrift für Arthur Spiethoff, 1933], pp. 240–41.)

important question therefore (whether or not Keynes's theoretical analysis of underemployment equilibrium is correct) is how to remedy this situation. Keynes's proposals are designed to offer a substitute for a completely planned socialistic or communistic economy. His solutions are, as we have seen: (1) the rigid maintenance of the rate of interest below the marginal efficiency of capital until full employment is reached, (2) the forced redistribution of income through taxation designed to increase the propensity to consume, and (3) socially controlled investment.

The first proposal is in line with current monetary theory. But efforts at general monetary control have already revealed the weakness of this method. Indirect control—open-market operations and discount policy—is in process of being supplemented by direct monetary intervention (witness current measures to control the volume of funds placed at the disposal of the stock market) which borders on regimentation and rationing—a kind of monetary NRA. The third proposal goes far in the direction of a planned economy and might, indeed, lead straight into thoroughgoing socialism. How far taxation of incomes and wealth (the second proposal) may be carried without breaking down is problematical. Whether or not a drastic program of taxation carried far enough to effect a genuine redistribution of income is compatible with a system of private enterprise and private initiative; whether or not such a program would only serve to make a "flat situation still flatter," thereby leaving no alternative except complete socialization, may perhaps finally be decided at the bar of history.

It will be noted that all of these methods seek to establish full employment either: (1) by a curtailment of the volume of individual savings through a redistribution of income, or (2) by forcing these savings into investment at low interest rates through a program of socially controlled investment. But there is a vast difference between a spontaneous expansion of investment and employment, such as we witnessed in the nineteenth century, and a forced investment such as Keynes seeks to bring about by artificially contrived measures. When spectacular fields for profitable investment are opened up through the development of new re-

sources, the introduction of technological innovations, the expansion of population, and the growth of new industries, then savings are sucked up, labor is scarce, and industry booms through the drawing power of an expanding demand. When, however, savings must be forced, the outflow of funds into real investment becomes difficult and sluggish, and business is likely to stagnate—unless, indeed, the state goes the whole way and assumes full entrepreneurial responsibility.

In brief, it is not improbable that the continued workability of the system of private enterprise will be made possible, not by changes in prevailing economic institutions (such as those advocated by Keynes), but rather by the work of the inventor and the engineer. Just as technological progress has been mainly responsible for the great advance in real wages and in standards of living during the last century, so also it may well turn out that in the future we shall have to look to new outlets for profitable investment—new discoveries in technique, new ways of utilizing nature's resources, new products, and new industries—if we expect the prevailing economic system to survive.

Whether or not Keynes's proposals will in fact prove effective, it is clear that they are currently popular and are likely to be tried on an expanding scale. Modern communities appear to be in process of reverting to the behavior patterns of the precapitalistic period. Leisure and luxurious consumption were leading characteristics of that era. Numerous holidays, magnificent entertainments, prodigality in consumption (*vide* cathedrals, castles, art products requiring infinite detail and leisurely, time-consuming workmanship)—these distinguish the precapitalistic period from the nervous speed and the emphasis on thrift and saving which characterized the nineteenth century. Keynes's economic system is, as he himself admits, a reversion to the economic doctrines of mercantilism. Modern societies are, in his view, being driven by the logic of events into pursuit of the same ideals which the mercantilists cherished. They were right, he thinks, in the enforcement of usury laws designed to maintain a low rate of interest. They were too close to the experience of an exuberant prosperity and rising prices, which the inpouring of precious metals from the

new world had generated, to overlook the importance of an abundance of precious metals. They were right, he thinks, in their preoccupation with the balance of payments and their fear that a drain on the precious metals would, by affecting the terms of lending, check the growth of investment and employment. They were right in their "deep rooted belief in the utility of luxury and the evil of thrift." These are the corner stones of Keynes's economic philosophy, and it is not difficult to see that, whatever may be true of the correctness of his theoretical analysis or the workability of his proposals, the enigma of unemployment and business depression has already impelled modern capitalistic economies far toward the reconstruction of a mercantilistic world.

In conclusion, a word should be said about Keynes's view of the trade cycle. Let it be noted that *The General Theory of Employment, Interest and Money* is only incidentally concerned with the trade cycle. Cyclical fluctuations may occur in either a full-employment equilibrium system or in an underemployment equilibrium system. The theory of the trade cycle is, therefore, something substantially apart from the theory of long-run underemployment or full-employment equilibrium.

In his "Notes on the Trade Cycle" (chap. xxii)—a brilliant performance, even though, as Keynes admits, it contains essentially nothing new—Keynes finds that the cycle is mainly due to fluctuations in the marginal efficiency of capital. The movement is cyclical in the sense that the forces propelling the system upward at first gather force cumulatively but gradually lose their strength until a point is reached at which they tend to be replaced by opposite forces, which in turn gather force cumulatively until they, too, wane. The movement is cyclical, also, in the sense that these upward and downward movements occur with a recognizable degree of regularity in time-sequence and duration. A complete explanation of the cycle must, moreover, involve an analysis of the crisis—the sudden and violent turning point from boom to depression.

Let us consider these points briefly and in their inverse order. The phenomenon of the crisis may be explained by the precarious character of expectations of future yield on new investment—

expectations based on highly shifting and unreliable evidence. The boom progresses on overoptimistic expectations. Disillusionment brings a sudden and drastic collapse in the prospective rate of profit—the marginal efficiency of capital.

Periodicity of the cycle rests upon two bases: (1) the length of life of durable assets in relation to the normal rate of growth, and (2) the carrying costs of surplus stocks.

The increase in the marginal efficiency of capital awaits the depreciation and obsolescence of the capital stock accumulated during the boom. This, of course, is nothing new. Karl Marx, Aftalion, Robertson, and others have stressed the relation of average durability of capital to the length of the depression.

The carrying costs of surplus stocks is the second important factor, in Keynes's view, which determines the duration of depression. The carrying charges tend to force the absorption of surplus stocks within a certain period, usually within three to five years. While the process of stock absorption is going on there is negative investment and, therefore, deflation and unemployment.

Keynes's emphasis on fluctuations in the marginal efficiency of capital as the moving cause of the trade cycle is in line with Spiethoff's analysis, though there are many points of difference. Moreover, the conclusion that the collapse in the marginal efficiency of capital may be so complete that the most favorable monetary condition is quite inadequate to produce a revival, is also in line with Spiethoff's view. With Spiethoff, however, the increase in the marginal efficiency of capital (without which revival would be impossible) is caused by inventions, discoveries, the development of new resources, new products, and new industries. With Keynes the absorption of stocks, the depreciation and obsolescence of fixed capital, and the effects of these upon the prospective yield of new investment, are the points stressed.

Keynes supports, as one remedial measure for the trade cycle, the program of redistribution of income designed to increase the propensity to consume. However, according to his own analysis, the cause of the trade cycle is fundamentally to be found in *fluctuations* in the marginal efficiency of capital, and it is difficult to see how a permanent change in the distribution of income could affect

these fluctuations. In other words, at this point Keynes is clearly confusing the problem of long-term equilibrium with the problem of short-term cyclical fluctuations.

Keynes's new book, as with everything which comes from his pen, will stimulate thinking on fresh lines in the field of economic dynamics. There are too many obscure corners in our science to permit of comfortable dogmatism. The economic order is clearly in a state of transition to no one knows what. The system is half rigid, half flexible. A theoretical apparatus applicable to a flexible system is not always adequate for an analysis of current economic life. The problem of wage rigidity, for example, is not as simple today as formerly. A system which stands somewhere between a laissez faire economy and a regimented economy presents exceptionally difficult problems for public policy. We are living in a time when economics stands in danger of a sterile orthodoxy. The book under review is not a landmark in the sense that it lays a foundation for a "new economics." It warns once again, in a provocative manner, of the danger of reasoning based on assumptions which no longer fit the facts of economic life. Out of discussion and research will come bit by bit an improved theoretical apparatus (Keynes's interest theory contains promising suggestions) and a more accurate appreciation of social psychology (the brilliant chapter on long-term expectation) and of the precise character of the economic environment in which humans act as individuals and in groups. The book is more a symptom of economic trends than a foundation stone upon which a science can be built.

AN INDEX OF WORKING CLASS PURCHASING POWER FOR GREAT BRITAIN, 1929–35

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FOR the last five or six years the author has submitted for discussion in his seminar classes a simple index which showed during the recent depression such unexpected results that the details are worth publishing. The index is simple since, with one exception, it is made up of well-known constituents; but the particular combination aimed at has not hitherto been attempted. The aim of the index is to measure the changes in the total real income of the working class, whether actually working or unemployed. To achieve this measure three main constituents are required: (1) changes in the total money income of those employed; (2) changes in the total money income of those unemployed; and (3), in order to convert money into real incomes, changes in the working-class cost of living. Once these constituents are obtained, the formula is simply

$$\frac{(1)+(2)}{(3)}.$$

1. The total income of the employed depends upon the numbers employed and the prevailing average wages. Both these items are easily accessible. The first line (*a*) of Table I gives in thousands the official figure of the "average number of insured workers aged 16–64 in employment" published in the Reports of the Ministry of Labour. The second line (*b*) of Table I gives Professor Bowley's wage index appearing in the London and Cambridge Economic Service averaged for the year and recalculated on 1929 as the base period. The third line of Table I gives the product of *a* and *b*, representing the relative aggregate income of the employed.

2. The total income of the unemployed depends upon the numbers unemployed and the average of payments made to the unemployed. The fourth line (*c*) of Table I gives in thousands the average of the total unemployed for the four quarters of the year, published in the quarterly supplements of the *Ministry of Labour Gazette*. The per capita average of payments to the unemployed has not hitherto been measured in index numbers. These payments consist either (1) in

benefits covenanted under the national unemployment insurance acts, or (2) in "transitional payment" or "assistance" when, usually after six months, the right to benefit is exhausted, or (3) in relief under poor law. Persons receiving payments in the form of (1) and (2) constituted in the period under review from 78 to 91 per cent of the total unemployed. Their average weekly payment per head is given in the annual reports of the Ministry of Labour and is shown in the first column of Table II. The remainder of the unemployed either receive poor law relief or get nothing.

TABLE I

CALCULATION OF WORKING CLASS PURCHASING POWER INDEX FOR GREAT BRITAIN

	Year						
	1929	1930	1931	1932	1933	1934	1935
1. Employed (thousands) (a)	10,220	9,797	9,421	9,348	9,681	10,136	10,371
2. Wages index (b)	100	90.1	97.7	95.9	94.8	94.8	95.8
3. Relative aggregate income of the employed ($a \times b$)	10,220	9,709	9,202	8,962	9,179	9,609	9,935
4. Unemployed (thousands) (c)	1,227	1,912	2,649	2,745	2,521	2,159	2,038
5. Unemployment-pay index (d)	30	33.7	35.9	31.0	30.8	32.1	35.2
6. Relative aggregate income of the unemployed ($c \times d$)	368	644	951	851	777	693	717
7. Total (money) income ($ab+cd$)	10,588	10,353	10,153	9,813	9,956	10,302	10,652
8. Total (money) income index	100	97.8	95.9	92.7	94.0	97.3	100.6
9. Cost of living index (e)	100	96.3	90.0	87.8	85.4	86.0	87.2
10. Purchasing power index $\left(\frac{ab+cd}{e}\right)$	100	101.5	106.6	105.6	110.0	113.1	115.4
11. Growth of population index	100.0	100.4	100.9	101.4	101.8	102.2	102.6
12. Growth of occupied population index ($a+c$)	100.0	102.3	105.4	105.6	106.6	107.4	108.4

The precise average relief per head is difficult to discover. In attempting to estimate the over-all income per unemployed worker, the safest plan is therefore to give an upper limit which assumes that all the unemployed receive as high an average income as recipients of unemployment benefit or assistance, and a lower limit which assumes no poor relief or other income for the non-recipients of benefit or assistance. These limits are, in column 3 of Table II, converted into index numbers with the upper limit in 1929 equated to 100. Both limits have the advantage of being easily calculated, but for present purposes we shall use only the conservative lower limit since it tends against our conclusion as to the importance of unemployment pay and imposes the severest test of its truth. But it is open to other investigators, prepared to enter into the details of British poor relief, to use some more accurate middle figure within those limits.

The income of the unemployed must now be added to the income of the employed, and the problem arises of the relative weight to be attached to each. The first column of Table II gives the actual average income of the majority of the unemployed, namely, those in receipt of unemployment benefit or assistance. The figure usually accepted as the average earnings for all employed wage-earners in 1924 is around £120 a year[1] or 46*s* a week. Wage rates, according to Bowley's Index, changed little between 1924 and 1929, so that in 1929 the average income of anyone becoming unemployed, but receiving benefit or assist-

TABLE II

DETAIL OF CALCULATION OF INDEX OF UNEMPLOYMENT PAY PER HEAD

Year	Average Weekly Unemployment Benefit or Assistance per Recipient (shillings)	Percentage of Recipients to Total Unemployed	Possible Limits of Index No.* (Upper Limit Base 100)	Lowest Possible Index No. (Base 30)
1929.....	17.7	78.8	100.0–78.8	30.0
1930.....	17.8	88.1	100.6–88.6	33.7
1931.....	18.2	91.6	102.9–94.2	35.9
1932.....	17.2	83.8	97.2–81.4	31.0
1933.....	17.2	83.3	97.2–81.0	30.8
1934.....	18.2	82.0	102.9–84.4	32.1
1935.....	19.6	83.5	110.7–92.5	35.2

* Upper limit assuming that non-recipients of unemployment benefit or assistance receive under the Poor Law as much as recipients. Lower limit assuming such non-recipients receive nothing also under the Poor Law.

ance, may be taken as dropping from 46*s*. to 17.7*s*., or to 38.5 per cent of his income when employed. The necessary weighting may thus be effected by correcting the upper limit base of the unemployed income index from 100 to 38.5. The corresponding correction of the lower limit, which allows for those not receiving benefit or assistance, is from 78.8 to 30.3. Acting conservatively, 30 may thus be taken as the weighted base for the new index measuring changes of average income of the unemployed in relation to the changes of the average income of

[1] The Census of Production of 1930 shows a wage bill in manufacturing, building, or mining industries of £455,305,000 for the 3,802,524 operative staff in the sample firms furnishing returns. This gives an average wage per head of £120 per year. Colin Clark (*The National Income, 1924–31*, p. 61) gives £116 per year in 1924 as the average earnings per wage-earner employed for all gainful occupations. The employment figures dealt with in this article exclude agriculture and domestic service, both relatively low paid, and include some salary earners subject to unemployment. Hence the round sum of £120 is not an overestimate. It might be an underestimate if it were not true that unemployment was greater in low-paid occupations.

the employed with a base of 100. This index worked out in the last column of Table II appears in the fifth line of Table I. The sixth line of Table I gives the product of the number unemployed and this index number of their relative average income, and thus represents relative aggregate income of the unemployed. The seventh line totals the relative aggregate income of the employed (line 3) and of the unemployed (line 6) and represents the total money income of the working class; the eighth line reduces this relative aggregate money income to an index number with base of 100 in 1929.

3. It remains to convert changes in money incomes to changes in real income through the usual procedure of division by a price index. The price index used is the well-known cost-of-living index of the Ministry of Labour, applying to a typical working class family. In line 9, it is presented with base of 100 in 1929; division of the total money income index gives, in line 10, the purchasing-power index we have been seeking. For purposes of comparison on the same base, line 11 gives the growth of population in Great Britain, and line 12 the growth of the occupied population insured against unemployment—the sum of employed (line 1) and unemployed (line 4).

CONCLUSION

The outstanding and most unexpected feature is the maintenance and surpassing of the 1929 working class purchasing-power level in every year throughout the period of depression. This remains true even when population growth is taken into account and purchasing power is reckoned per head.[2] There is, in fact, a continuous rise in real purchasing power with the one exception of the year 1932, when "cuts" were made in payments to the unemployed and the means test was introduced. This continuous rise is primarily due to a fall in the cost of living which far outstripped the fall in wages, but the influence of the payments to the unemployed must not be neglected. The money income of the employed, given in line 3 of Table I, fell from 1929 to 1932 slightly more rapidly than the cost of living; hence if the unemployed had received nothing, total working class purchasing power would have fallen slightly. The rise in total purchasing power during the critical years is thus a clear result of the payments made to the unemployed. The lowest estimate of the average amount of these payments has purposely been chosen but, even so, the rise was some 6 per cent in the four years during which unemployment was more than doubling.

[2] If the purchasing power is reckoned per head of insured occupied persons only, then, comparing lines 10 and 12, it will be seen to remain roughly constant between 1929 and 1932 but to rise definitely after that.

NOTE ON FACTORS AFFECTING OUR MONETARY SUPPLY

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STATEMENTS are frequently found in the writings of American economists to the effect that under the national banking system during the post–Civil War period, "fluctuations in the amount of money were largely determined by gold movements."[1] It appears reasonable to believe that as gold has flowed into and out of our country, the monetary supply has been correspondingly affected. A check of the available data produces results that may well justify a questioning of this commonly accepted statement.

The term "amount of money" may be taken to mean either "money in circulation" or "stock of money." The term "gold movements" is taken to refer to gold imports and gold exports.

For the purpose of ascertaining whether or not gold movements influence "money in circulation" or "stock of money" in the United States, three periods were selected for analysis: (1) 1867–1913 (the post–Civil War years under the national banking system); (2) 1914–33 (the World War and post–World War years under the Federal Reserve System); and (3) 1921–25 (a fairly normal period under the Federal Reserve System). The data used were taken from the reports of the United States Treasury. The results follow:

1. Net gold imports and net gold exports moved annually in harmony, respectively, with an increase and decrease in the total stock of money twenty-nine times out of a possible forty-seven during 1867–1913, and fifteen times out of a possible twenty during 1914–33.

2. Net gold imports and net gold exports moved annually in harmony, respectively, with an increase and decrease in the amount of money in circulation thirty-two times out of a possible forty-seven during 1867–1913, and nine times out of a possible twenty during 1914–33.

3. From 1867 to 1913, inclusive, with net gold exports of $158,000,-

[1] Cf. S. E. Harris, "The Commercial Theory of Credit," *Journal of Political Economy*, XLIV (1936), 95.

000, the total stock of money was increased by $2,756,000,000; the amount of money in circulation was increased by $2,559,000,000.

4. From 1914 to 1933, inclusive, with net gold imports of $2,077,000,000, the total stock of money was increased by $6,280,000,000; the amount of money in circulation was increased by $2,260,000,000.

5. During 1867–1913, with twenty-eight instances of annual net gold exports, there were ten instances of a decrease in the total stock of money and thirteen instances of a decreased amount of money in circulation. During 1914–33, with seven instances of annual net gold exports, there were four instances of a decrease in the total stock of money and eight instances of a decrease in the amount of money in circulation.

6. The data for 1921–25 were analyzed both on a monthly and a yearly basis. Net gold imports and net gold exports moved monthly in harmony, respectively, with an increase and decrease in the total stock of money thirty-seven times out of a possible sixty; annually, five times out of a possible five. They moved monthly, respectively, in harmony with an increase and decrease in the amount of money in circulation thirty-eight times out of a possible sixty; annually, three times out of a possible five. From January, 1921, to December, 1925, there were net gold imports of $1,322,000,000, but the total stock of money in December, 1925, was less by $172,000,000 than in January, 1921, and the amount of money in circulation was greater in December, 1925, by $20,000,000 than in January, 1921.

Authors commonly overlook the fact that the United States is a gold- and silver-producing country and that as a consequence our monetary supply is greatly affected by the annual production of those metals. From 1867 to 1913, although our net gold exports totaled $158,000,000, the stock of monetary gold increased from $186,000,000 to $1,870,000,000. Monetary silver increased from $1,149,000 in 1873 (no prior data) to $568,000,000 in 1913. Subsidiary coinage increased from $8,000,000 in 1867 to $175,000,000 in 1913, and national bank notes increased during the same period from $298,000,000 to $759,000,000. During 1914–33 Federal Reserve notes were an extremely important element in the total stock of money and the amount of money in circulation.

BOOK REVIEWS

The Behavior of Money: Exploratory Studies. By JAMES W. ANGELL. New York: McGraw-Hill Book Co., Inc., 1936. Pp. xiv+207. $3.00.

This is a work of commanding significance in monetary science, not only for the extraordinary factual intelligence which it offers upon mooted questions of theory and policy, but also for the spirit in which it is written and for its promise of the future. Without rhetorical fanfare, without recourse to the current mode of browbeating readers inept in higher mathematics with galaxies of equations, and without employment of the most "refined" (and often the most fallible) statistical devices such as standard-deviation units and correlation coefficients, Professor Angell presents in modest, comprehensible, and brief terms the results of his extensive work on American banking series.

The study falls into four major sections, the first being concerned with the relations between currency and deposits and certain important economic variables. A comparison of volume of "outside" currency with circulating deposits (1890–1935) shows, not the constant proportion predicated by Fisher and Hawtrey, but a gradually and continuously decreasing ratio. Monthly data for both series since 1919 "move with or after, but apparently never before" indices of production and trade, so that causation seems to involve "mutually aggravating actions and reactions," and not a simple action from money to trade or vice versa. So far as concerns each large division of money separately, variations in outside currency are associated most intimately with movements of small individual incomes (factory pay-rolls) and retail expenditures (department-store sales), whereas circulating deposits parallel the changes in several measures of wholesale and financial activity. Special movements and peculiarities in these series for particular periods evoke from the author a wealth of interpretive comment. Most important, however, is the relevance of the chief monetary behavior patterns revealed in this section to such theoretical topics as causation between monetary and economic variations (pp. 42, 47, 60), interest as a controlling factor (p. 164), Hawtrey's "internal drain" (p. 32), and sequences between income and retail expenditure

(p. 48) and reflation (pp. 61 and 160). Professor Angell does not call attention to the possible application of the contrasting behavior of outside money and deposits to Keynes's "income" and "financial" circulations, or of the general seasonals in deposits to Machlup's hypothesis of inflation through the "utilization" of seasonal idle funds.

The second portion on "Some Regional Comparisons and Interregional Relations" is rather less exciting, but certainly substantial. Aside from the record it presents on the relative changes in banking importance of the twelve Federal Reserve districts (1919–34), the section illuminates the problem of the impact and diffusion of foreign gold through New York to the inland (pp. 86–88), and also the response of New York to domestic gold and deposit movements. The present reviewer finds to his satisfaction the confirmation of an opinion on a priori grounds that, despite the high velocity of credit in stock-exchange transactions, a statistical study would probably reveal a tying-up of substantial quantities of deposits (Angell, pp. 66, 77).

From the statistical studies of "The Exchange Velocity of Bank Deposits" constituting the third main inquiry, Professor Angell is able to discern in all of his velocity indices four types of movements varying from "heavily marked" to "fairly clear": an intra-month cycle, a seasonal pattern, a trend for the period 1921–34 (broken sharply at the end of 1929), and a pattern of "cycle-accidental deviations." The intra-month cycle is explained easily with reference to payment customs, and seasonal velocity variations strongly suggest a relation to the "aggregate of *all* transactions, financial as well as nonfinancial" (p. 111). But for trends and "cycle-accidental" changes, both of which give substantially similar results, the data for one hundred and forty cities outside New York show a correlation with production and wholesaling activity before the end of 1929, and thereafter a correlation with financial transactions; while New York itself shows a deposit velocity associated throughout with financial transactions. Angell concludes from an examination of crucial changes that no definite causation can be established between velocity and economic factors such as production and exchange operations, and that the regulation of bank-reserve requirements on a velocity basis would be too tardy and indirect. Professor Hayek has furthermore to atone for his cardinal "sin of omission" of the entire "financial circulation" (in Keynes's terminology), since Angell now demonstrates that stabilizing the total "effective" volume of money (quantity *times* velocity) would often produce effects "indifferently related or even inverse to those which the current move-

ments of nonfinancial economic activity would seem to require" (p. 128).

No less significant are the findings of a concluding section on the "Circular Velocity" of money, employing the extremely neat and satisfactory device of calculating this velocity simply as national income for the period in question divided by the volume of "circulating money." During the period from 1909 to 1932, when hoarding disrupted the trend, circular velocity was remarkably steady, with a slight downward drift. National income is shown to have been linked with the changes and trends of stock of circulating money, not its circular velocity. From this the all-important conclusion is drawn that so far as stability of incomes is amenable to monetary control, "the most effective procedure is to stabilize the quantity of money itself."

In the course of his comparisons between exchange and circular velocity, Professor Angell seems to me to fall into one error and commit one peccadillo, both of which fortunately do not jeopardize the main arguments and conclusions concerning velocity, but which might be pitfalls in the further investigations promised by the subtitle *Exploratory Studies*. The peccadillo lies in his defining "exchange velocity" (p. 93) in terms similar to Fisher's "coin transfer" but in using the concept as the ordinary concept of velocity, or Fisher's "person-turnover"—a confusion carried over from Angell's earlier article on the subject (*QJE*, November, 1933, p. 46 and n. 7). The error, on the other hand, appears sharply in the statement that "if business becomes more highly integrated, exchange velocity will fall . . . ." (p. 94). The fact that "a larger proportion of total payment operations is now carried on by book transfers within the integrated units than before" reduces the money work to be done, not exchange velocity, as a rather extended discussion of Schumpeter's similar error by Marschak, Marget, and others, including myself, demonstrates. Integration does not affect the determinants of cash balances—the necessity for providing for contingencies and for the lack of coincidence and infrequency of payments—but only the number of payments, that is, T in the Fisher equation. Furthermore, this is the only attitude consistent with Angell's ascription of the slow downward trend of circular velocity (which really does fall when more stages are set into the circuit and exchange velocity remains unaffected) to exchange processes "becoming longer" (pp. 142, 154, 162). If exchange velocity were to rise proportionally with "disintegration" (as Angell would apparently argue), or with the exchange processes becoming longer, then, since circular velocity

equals exchange velocity divided by the "average number of stages" in production (p. 149), circular velocity could not possibly have fallen in the period 1921–32 but must, of arithmetic necessity, have remained constant!

The mention of these relatively small errors is not intended to detract in the least from the judgment of Professor Angell's work as really brilliant, not only in the definite and usable findings which it offers on the most timely issues of monetary theory and practice, but in its promise of a new and much more empirical turn in the whole subject. The author has not set about merely writing a book, since extensive labors by himself and his collaborators have often been condensed to mere references or appendixes; he has, instead, presented the barest summaries, complemented by a conservative but trenchant appraisal of their significance. The advancement of monetary science at the present juncture hinges upon precisely such "exploratory studies" as these.

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I trasferimenti anormali dei capitali e le crisi. By MARCO FANNO. Turin: Giulio Einaudi Editore, 1935. Pp. 154.

This book is part of a series of pamphlets—which have met with a very favorable reception in Italy—with which Mr. Giulio Einaudi (the son of the well-known Italian economist) has proposed to illustrate the various aspects of the present economic situation in the world. Professor Fanno, the distinguished economist of Padova University, analyzes in this book the effects of abnormal international capital transfers. The difference between normal and abnormal capital transfers is, according to the author, the following: normal transfers take place when there is a difference in the rates of interest prevailing in the countries concerned; abnormal transfers are occasioned by other causes, such as the payment of a war indemnity, or of interest on debts incurred abroad on account of a war; an excessive burden of taxes in the country from which capital is transferred; fear of political disturbances; lack of confidence in a country's banks or in its currency.

The author gives a close description of these different kinds of abnormal capital transfers. Inquiring into the effects of the payment of a war indemnity, he criticizes the conception of an "automatic" transfer, which had a certain repute in past years, when it was discussed in connection with the German reparations payments.

One of the most interesting chapters of the book is the analysis of that form of "flight of capital," which has occurred in the last two decades on a vast scale in some countries, where people sold on the internal market stocks or bonds, or land, or houses, and the like, in order to buy with the proceeds foreign currencies. Professor Fanno argues that, when these sales are absorbed by the normal savings of the public, the transfer will not arouse peculiar difficulties; it will, of course, not be the goods sold by the original owners which will be exported, but other exportable commodities out of the actual flow of production. The consequences of the "flight of capital" are much more serious when the flow of new savings is insufficient to take over the capital goods which are offered for sale. Then, according to Professor Fanno, an expansion of bank credit is needed in order that the latter goods might be bought, and the volume of bank deposits will increase. If, afterward, these bank deposits are transferred to other countries, a corresponding export of goods is not likely to be called forth, because there are not available in the country large stocks of readily exportable goods (p. 69). When the bank savings are merely a monetary expression of the spontaneous saving of the public, to them there will correspond on the goods side the formation of equivalent stocks of commodities, that is to say, of those commodities from whose consumption the public have refrained and which might be exported. This, however, is not the case for bank deposits which have been created by bank credit. If, then, these bank deposits are transferred to other countries, gold has to be shipped, and this will put an increasing strain upon the monetary system, until the gold standard breaks down and exchanges depreciate.

Professor Fanno would advocate in this case a severe control upon foreign exchanges in order to prevent a further depreciation. I think that a more efficient measure against the flight of capital, and the danger of a collapse of the exchanges, would be to prevent from the beginning a credit expansion, since Professor Fanno himself contends that part of the goods offered for sale by those who wish to transfer their money abroad are bought by the help of bank credit.

Professor Fanno gives in the following chapters an acute analysis of the relations between abnormal transfers, the "freezing" of foreign credits, and the present economic crisis, taking as a concrete example, more especially, the German financial crisis of 1931.

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The Price of Gold: Documents Illustrating the Statutory Control through the Bank of England of the Market Price of Gold, 1694–1931. Edited by I. SHRIGLEY. London: P. S. King & Son, Ltd., 1935. Pp. ix+108. *7s. 6d.*

In this collection of documents Miss Shrigley has brought together some of the more important acts and regulations governing the gold standard and the price of gold in Great Britain since 1694. Useful footnotes have been appended to some of the documents, particularly the Bank Act of 1844, indicating provisions repealed by subsequent legislation. Several tables of gold and silver prices are appended. One table gives a series of average annual prices of gold, together with the average market premiums above the Bank of England's minimum buying rate, from 1870 to 1932; and a series of daily gold prices from September, 1919, to April 30, 1925, is presented in another table. Other tables show the average annual ratio of silver prices to gold prices from 1687 to 1932, and the monthly range of fluctuations in the price of bar silver from 1833 to 1933. A convenient list of the governors of the Bank of England from its founding is also given.

The most useful section of the book deals with the period following 1914, where regulations, such as the Army Order XIII concerning British gold at the front, are reprinted, in addition to the better-known acts. The impression gained by the present reviewer from the material presented is that notes were still convertible into sovereigns, but that restrictions on gold exports and patriotic propaganda prevented such conversions—the conventional theory expounded by writers dealing with the period. The work of Cannan and Harris suggests that this view is open to serious question. No account is given of the measures taken to prevent melting of coin, and Miss Shrigley's comments on page 63 concerning the effectiveness of propaganda in bringing voluntary return of gold coin to the government might well have taken these regulations into account.

The apparent purpose of the collection, as indicated in the Introduction and the subtitle, "Documents Illustrating the Statutory Control through the Bank of England of the Market Price of Gold, 1694–1931," seems to have been fulfilled only in part. The omission of the acts by which specie payments were suspended in 1797 and resumed following the Napoleonic Wars seems unwarranted. Some reference might also have been made to the series of regulations and laws concerning the mint ratios of silver to gold which led to the actual establishment of the gold standard during the eighteenth century. It should

also be noted, that, except for the original charter of the Bank of England, the more important documents reprinted, in particular the Bank Act of 1844, the Currency and Bank Notes Acts of 1914 and 1928, and the Gold Standard Act of 1925, are to be found in Gregory, *British Banking Statutes and Reports, 1832–1928*.

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Economic History of Europe. By HERBERT HEATON. New York: Harper & Bros., 1936. Pp. xiv+775. $3.50.

A new textbook by a veteran scholar is particularly welcome in a field with so few choices. This book is especially timely because of its many references to articles in the new journals of the past decade and in the *Encyclopaedia of the Social Sciences*. The unfortunately brief file of the *Journal of Economic and Business History* and the continuing one of the *Economic History Review* have been combed quite thoroughly, the *Annales d'histoire économique et sociale* not much less so. If there is not so much from *Economic History*, the fact may be ascribed to the character of the journal itself. Authorities in German get much less attention than those in French. Major works of writers like Dopsch, Kuske, and Rörig are neither mentioned nor reflected in the text.

Prehistory, the ancient Near East, Greek and Roman economy, and the first half of the medieval period are all disposed of in 78 pages. This part may be called introductory, as the space could not give much continuity to forty centuries and more of complex events and institutions. Even though it may be omitted by many undergraduate classes, or most of them, its inclusion was not necessarily a mistake. But the light shed by ancient upon medieval economic history is not always quite so dim, or the break quite so apparent. A few scholars like Dopsch have at least tried to establish the continuity of institutions and practices by sticking to those which certainly had a continuity somewhere. Money, credit, and distant trade were among the most active and persistent inheritances from the time men developed them ages ago. But political history has handed us a nine-lived tradition of dealing with areas one at a time. Following it, this manual, like most earlier ones, makes a fresh start in Europe north of the Alps, and proceeds to suggest by arrangement, if not otherwise, that towns with their industry and commerce were somehow generated by rural economy. The ideol-

ogy is reminiscent of the evolutionary anthropology current a half-century ago.

Chapter v of this book, on the "Makers of Medieval Economic Society," is a *dramatis personae* for crusading times and after, rather than an attempt to connect ancient economy with high medieval. Then comes a descriptive chapter on rural life, especially in England, followed by one on rural change which takes in Continental situations much more fully. Towns and industries appear in chapter viii, followed in order (ix, x, xi) by interregional commerce, urban economic organization, and, finally, regulation or "corporateness" as a whole. From the standpoint of continuity in economic institutions and practices, it would be interesting to see somebody reverse this order, bringing in economic organization and finance of the persistent urban types early, and treating the economy incident to feudalism as a frontier interlude.

The historian's training is likely to confuse his standards of importance when he turns to temporally long and territorially wide continuities, especially in reference to types of cultural inheritance which are so readily diffused, so separable from any particular complex. "Pure history" rightly emphasizes what seemed important at the time and place. On the contrary, synthesis must and does lean heavily upon vitality or survival power as a basis of selection, in which large use is made of "hindsight." Writers like Sombart and Simiand, whose method is sociological in the European sense of the term, are inclined to be overinductive. A few historians, notably Rörig, seem at times on the verge of co-ordinating the two approaches.

There is a degree of realism and great pedagogical convenience in the common practice of separating the last two or three centuries of the European middle ages as a special period leading directly into the modern. Even writers like Rörig, who violently dislike Sombart's system as a whole, retain this division, based largely on the rise of *Schriftlichkeit*, or literacy in business, including accounting and correspondence. More distinct periodization of this sort would add clarity to this new manual, and tend to keep alive in the student's mind the notion that the economy as a whole was in process of development.

Again in the early modern section (chaps. xii–xvi, roughly 1500–1750), Professor Heaton is in the "pure history" tradition. Under the name of "economic powers," political states carry the narrative; yet the chapter on the state and economic life comes last, and economic

organization next to last. Money gets in fairly early as Spanish treasure from the New World, but reasoning about financial institutions is rarely sharp. Following Heckscher, transactions involving deferred payments in recognized standards of value are mistaken for barter (on this point see especially pp. 182 f. in the medieval section). Good use is made of Nef's work on early modern industrialization in England, but the relation between larger-scale production and commercial organization is none too clear. The term "commercial revolution," commonly used for this period and these materials, is avoided. Perhaps this represents sound historical judgment. Just the same, the conception lent a sense of movement and buoyant change to events which is lacking here. After all, economic development is the main theme of these classroom syntheses.

The confusion of Earl J. Hamilton's chapter, "Why Prices Rose" (xiii in *American Treasure and the Price Revolution in Spain, 1501–1650*), reappears, elaborated if not magnified. On page 249 of Heaton, Hamilton's graph (his p. 301) on Spanish treasure imports is reproduced. Exactly underneath it, in a position to invite direct vertical comparison, is a graph of European wheat prices from 1500 to 1750. Hamilton's graph covers a period a whole century shorter, but the two are given bases of identical length. The startling resemblance at first glance is materially reduced by the rather tedious and difficult task of comparing the two by time sections. On reflection, it is discovered that the whole procedure is erroneous as followed by both authors. In so far as the quantity of money is a factor in prices, the relationship is a direct one between the treasure in circulation and the price level at the time. The treasure imports curve consists of first differences, and is not comparable with a price curve in index form. Wheat is an annual crop for consumption, and does not accumulate like precious metal. Hamilton forces a correspondence between treasure imports and prices down to 1600 by his choice of scales. There the curves part company, the price curve failing to sag with the declining increments of precious metal. Theoretically, this is exactly what should occur if the treasure imports get into circulation and the quantity of money is the chief factor in pricing, as correct graphing of Hamilton's own figures will indicate. That is, as long as the metal imports are above zero their effect will be to raise prices.

Professor Heaton makes slight innovations in the handling of the period commonly called the "industrial revolution." Having carried

early modern times up to the conventional ending of the "commercial revolution" around 1750, he inserts a short chapter (xvii) on the "Economic Characteristics of the Last Two Centuries." A series of "since 1700" chapters follows—note the half-century overlap. Those on agriculture are by countries (political units). However, the single chapter (xxi) on "European Industries since 1700" is general, taking the place of the usual one on the "industrial revolution." Instead of dealing with the factory system by that name, chapter xxiii is entitled "Industrial and Commercial Organization." Thus industrialization since 1700 or 1750 gets relatively less space than in most manuals, presumably to make up for the expanded treatment of the commercial revolution. Certainly economists who use the manual will not complain because the discussion of industry is not split up by political states; but why not follow the same method in dealing with agriculture? However little we may like Sombart's specific proposals for an economic framework in which to consider economic development, the fact remains that most of the general continuity scheme derived from political history is excess baggage for our purpose. We can neither use it effectively nor get along without some sort of *Protothese*.

One unfortunate result of trying to cover two centuries or more of specific subdivisions of economic change (British agriculture, French agriculture, modern transportation, European industries, etc.) in single chapters is that one subject gets separated from its relatives. The student loses sight of the European or North Atlantic economy as a whole in process of change. Chapters xxiv to xxx are practically separate introductions to special subjects: currency and banking, combinations, cycles, international trade, labor, etc. This may fit the needs of history students or others not mainly interested in economics, but these subjects are introduced in almost the same way in the various advanced courses offered by economics departments. What the teachers of these subjects expect of economic history is not duplication, but an emphasis upon the economy as a developing whole which they cannot give. In answer to their insistent demands for better co-ordination, our introductory course at Berkeley has shortened the chronology, emphasized economic organization and technology, and reduced treatment by political units—or even continents—to the minimum. We do not use a textbook.

Periodization, though always artificial to some extent, is the simplest method of avoiding chronologically long discussions of parts or details

of an economy. There are solutions nearer the history tradition than Sombart's. In his *History of Western Civilization*, H. E. Barnes has adopted an old pedagogical division made by Professor Allyn A. Young and the present reviewer. A split is made around 1860, with the introduction of cheap steel, the prodominance of factory methods in at least one country, the growth of rapid cheap transport, and the maturing of mass production. Professor Clapham has chosen roughly the same periodization in his *Economic History of Modern Britain*. Barnes has carried it a step farther, for a manual, by subdividing the second period along the lines of Meakin's "new industrial revolution," which thus becomes Barnes's "third industrial revolution." It is a convenience in the classroom, tending to hold the economy together in the student's mind.

The handling of quantitative change in economic history textbooks is almost uniformly below the standards of college students who have been exposed to the present-day elementary courses in statistics. A good new manual is always an invitation to take stock of the state of a whole discipline at the time; hence the foregoing remark does not single out one person for criticism. Neither is it an aside. On page 769, Volume II, of the Barnes work mentioned above, a table indicates that the export of cotton goods from Great Britain rose from $598,591,620 in 1911–13 to $1,410,372,000 in 1920–21. The original data are not cited. Turning to them, it is found that the post-war figure given is more than twice as high as that for any subsequent period of equal length—i.e., a tremendous isolated peak, and not representative at all. If we adjust the crude-value figures to a common base year, we see at once that the table conveys an idea just the opposite of the truth. Professor Heaton's table of the growth of British railroads from 1838 to 1910 (p. 545) is meaningless because it gives merely the number of passengers and of freight tons hauled, without reference to how far they traveled. Thus the student has no way of knowing what the track mileage figures mean in terms of the economic function performed.

On pages 454–55, the statement occurs that in the nineteenth-century agricultural crisis the French tariff was "raised on manufactured and farm products alike." In fact, agriculure received little protection in the tariff of 1881; but during the next two decades agricultural produce was put in a very special position, for example by the so-called *cadenas* law of 1897, which allowed the executive to raise rates by decree. The contrast of rates on page 455 is not dated at either end. It would appear from the (uncited) materials that the dates should be 1861

and 1914, though the only period mentioned nearby in the text is thirty years.

"Between 1875 and 1879 two-thirds of the vines were partly or wholly ruined, and the output of wine fell from 84,000,000 to 26,000,000 hectoliters" (lower down on p. 455). The vine phylloxera is described as "a green fly"! Wine production is always highly variable from year to year, 1875 marking a sharp isolated peak and 1879 a sharp isolated trough. If we find the data for ourselves and seek out the highest five-year average containing the year 1875 and the lowest including the year 1879, the drop is seen to be not the 69 per cent indicated by the figures given, but 46 per cent. The transplantation of the industry to Algeria is not mentioned in explaining the glut which followed the recovery of wine production in European France. As far as determinable from consumption statistics, it is not true that French taste shifted from wine to other beverages. The Franco-Algerian output has surpassed the old peak, and a larger percentage has been drunk by Frenchmen with the decline of export demand.

These are practically random samples, largely from the criticisms of sixteen advanced students in economics asked to report on this manual. Young people are severe critics. Their remarks about the continuity of this book would apply to nearly all the others, certainly including the manuals of American economic history. Professor Heaton's book is singularly meritorious in that it introduces the relatively mature student to the living, current literature—more of it than he can get a fair acquaintance with in a semester or a year.

A textbook being the kind of a utility it is, probably the utmost that should be asked of a new one is that it serve its purpose better than any of the old ones. Practically all the historians will think that this one does that. It distinctly represents the historian's viewpoint—a nice distinction made by Professor Gras years ago. But his example of the type was Faulkner's *American Economic History*, which has also found high and rather durable favor with teachers in departments of economics. We expect to use this text again next year, in an upper-division course, which would seem to be the acid test of opinion. I do not think it adapted to elementary students; but neither is any other manual of European economic history with which I am familiar.

M. M. KNIGHT

University of California

Industry, Trade and People in Exeter, 1688–1800: With Special Reference to the Serge Industry. By W. G. HOSKINS. Monograph No. 6, "History of Exeter Research Group." Manchester: Manchester University Press, 1935. Pp. 189. 9*s*.

History of the Huddersfield Woollen Industry. By W. B. CRUMP and GERTRUDE GHORBAL. Handbook, No. IX, "Tolson Memorial Museum Publications." Huddersfield: Tolson Memorial Museum, 1935. Pp. 132. 1*s*. 3*d*.

These two regional studies reveal the revolution that has taken place during the last two or three decades in the writing of local history. The economic historian who seeks information in the mass of eighteenth- or nineteenth-century histories of English towns or counties comes away empty-handed; churches, castles, aristocratic pedigrees, and local battles or disasters occupy all their pages, to the exclusion of economic and social affairs. Today the balance is being redressed; scholars who know their Lipson, Unwin, Mantoux, and Tawney are digging into local and national archives, pestering old families and firms for permission to examine private records, and producing works that are of far more than local interest. There is scarcely a single aspect of general economic history that does not gain greater clarity and detail from these two studies of Exeter and Huddersfield.

Mr. Hoskins describes the rise of Exeter to third place among English provincial towns and its subsequent decline to insignificance. In the early eighteenth century the Exeter merchants were selling their serges over a front ranging from the West Indies and Newfoundland to Hamburg and Norway, and were handling nearly 30 per cent of the woolen exports of the whole kingdom. Yet by 1800 this vast trade had virtually vanished; Exeter had become a local port of little consequence, and since then has been little more than "a small market town collecting and distributing for only twenty miles around." By careful use of port and customs records Mr. Hoskins has been able to measure the extent of this rise and fall. He has skilfully analyzed its causes, the organization of the commercial capitalism that controlled production and trade, the economic and social classes, the conditions of wealth and poverty, the movements of wages and prices, and the pains of adjustment from expansion to decay. At every point his work is as admirable as are the maps.

Mr. Crump, carrying on a study begun by Mrs. Ghorbal, has unraveled the story of the rise of the textile mills and factories in the

Huddersfield area of Yorkshire. Five years ago, in *The Leeds Woolen Industry, 1780–1820* (published by the Thoresby Society, Leeds), he showed his ability to piece together technical and economic fragments in a coherent moving picture. Thanks to his two studies, the birth and infancy of the factory system in the Yorkshire industry can now be described with a far greater measure of assurance than is possible for any other industry or region—Lancashire not excluded. It is perhaps unfortunate that his work should be buried in such publications of limited circulation as those of a local antiquarian society and a local museum. They are worthy of a far wider public, and would do credit to any university press.

HERBERT HEATON

University of Minnesota

Contempt of Court in Labor Injunction Cases. By CLEON OLIPHANT SWAYZEE. New York: Columbia University Press, 1935. Pp. 145. $2.25.

The last sentence of the book is: "The only important difference between present contempt law and that proposed [in the book] would be found in extending the use of a very satisfactory and traditional fact-finding institution, the jury." It therefore seems fair to say that the author's main thesis is that jury trial should be substituted for summary procedure in contempt proceedings for violation of labor injunctions. This has already been done for the federal courts in some cases by the Clayton Act and in more cases by the Norris–La Guardia Act of 1932. The book also proposes that in cases which involve "direct" contempt, as defined by the author, contempt proceedings in the labor-injunction cases should be held before some court other than that whose injunction has been violated. The author's suggestion of a reclassification of contempts, as direct and indirect, would draw the line between the two classes at the threshold of the "presence of the court."

This last suggestion seems to the reviewer to be a sound one; but the classification is to be used to enable us to determine which contempt cases are to be tried by jury, after indictment, and in some other court than that which has been contemned; and since the book does not make out a convincing case for the adoption of jury trial in contempt cases; nor for the taking of the proceedings away from the contemned court in labor-injunction cases, the suggestion for reclassification loses its importance.

The failure of the book to carry conviction lies in the assumptions used and the methods of reasoning employed. For example, the author falls into a quite common error, confusing two different things because they belong to the same genus. Some contempts of court consist of the publication of personal and more or less libelous criticisms of judges who have issued injunctions. In such cases, if the contempt proceeding is brought before the same court which has been criticized (as is commonly done), it is clear that the judge is, in a manner of speaking, both judge and a party to the proceeding. In such cases, it would seem desirable to take the contempt proceeding to some other court. But this book does not convince the reviewer that jury trial should be adopted, even in such cases; and the book contains no justification whatever for reasoning from this class of cases to the labor-injunction cases, in which contempt usually consists of violation or disregard of some decree of the court and in which no criticism of the judge is in issue. The problems in the two cases are clearly different, and inferences from one to the other are not convincing. The book makes use of some other methods as ineffective as this one; but considerations of space forbid analysis of them here.

The reviewer is not opposed to the proposals of the book. He is merely pointing out that, as a plain matter of fact, the book leaves the reviewer just where he was—in the no-man's land of neutrality on an issue which seems to be of little importance in the labor-injunction cases.

JAY FINLEY CHRIST

University of Chicago

The Unemployed Man. By E. WIGHT BAKKE. New York: E. P. Dutton & Co., Inc., 1934. Pp. xviii+308. $3.50.

Insurance or Dole? By E. WIGHT BAKKE. New Haven: Yale University Press, 1935. Pp. xii+280. $2.50.

In *The Unemployed Man* Dr. Bakke reports in a sympathetic but unsentimental way the adjustments and reactions of typical London workmen to unemployment and unemployment insurance. Dr. Bakke lived among these workers, and much of his book is in the form of quotations of conversations with them. This introduces a difficulty of organization of material which is, however, more than offset by the fresh and authentic tone—a freedom from academic pattern and stiffness.

We have become hardened to tabular presentations of the "problem of unemployment." The term "subjective" is often indiscriminately used to imply disparagement, whereas a subjective approach, as used in Dr. Bakke's reporting, is perhaps most successful in conveying the plight of human beings.

The Unemployed Man is essentially the record of the progressive disruption of the normal life of working people, the strain on family ties, the loss of established social contacts, the physical privation, the mental and physical deterioration of workers under the stress of involuntary idleness. It is not a pleasant story, and it needs telling, as is done here, in plain terms and with the emphasis given by those who are most directly concerned.

The chief desire of the workers was found to be job security rather than advancement in the economic scale. There is little or no place for individual initiative, but rather a desperate struggle for status, for an opportunity to work. The persistence of the search for work is amazing and can be explained only by the fact that regular, useful work is a fundamental human need, at least for those who have developed work habits. In the words of a riveter, "us men that's learned to work are lost without it."

Group pressures, plus the checking which it is possible to do through public employment exchanges, further reduce to negligible proportions the number who might malinger. Dr. Bakke found only three cases of malingering, and these were among the unskilled whose only work satisfaction was the wage that they received, a wage not much above the amount they could claim from the Insurance Fund.

Upon a situation characterized by a shortage of jobs and by insecurity has been imposed a system of unemployment insurance. Out-of-work benefits have relieved the severest suffering and have provided "enough" security to prevent the growth of a revolutionary movement. "Talk of revolution is conspicuous by its absence."

The Unemployed Man should be required reading for those who prate about the "pauperizing effects of the dole" and for those who think that a comprehensive system of social insurance will provide social security. Insurance "dulls the edge of desperation"; but employment, not insurance, is the fundamental need.

Insurance or Dole? should be useful to policy-makers and administrators of unemployment insurance. The successive changes in policy and adaptations of administration of the British insurance system to meet the changing economic pressures are recounted in detail. The problems

of eligibility and length of benefit period, the difficulties of the employment exchanges, the drift away from insurance, are studied with the hope that it will be unnecessary to "muddle through" in the United States.

This volume is evidently not intended for textbook use. There are other recent more comprehensive and systematically organized books on British unemployment insurance. The reviewer has been too close to subsistence farming and self-help projects to share Dr. Bakke's enthusiasm for them: "There is no finer sight in all England than these gardens on the outskirts of the villages and cities where men are raising potatoes, tomatoes and sprouts for their own use . . . ." (p. 178). Of the two books, *The Unemployed Man* appears to be definitely more successful.

GEORGE S. WHEELER

Washington, D.C.

Essays in Social Economics in Honor of Jessica Blanche Peixotto. Berkeley: University of California Press, 1935. Pp. 363. $2.00.

If the publication of this volume is to be not only a source of gratification—as it must be—to the one it honors, but also a public service, reviewers should probably devote the major part of the space assigned to a résumé of its contents. For, unfortunately, the book cannot be catalogued in a way that will indicate either the authorship or the subjects of the fifteen essays it contains. The diversity of the contents makes summarizing difficult. This diversity, however, is deliberate and not accidental. It is intended to suggest the breadth of Miss Peixotto's interests and the varied fields in which the men and women are found whose thinking and habits of work she has influenced.

The essays are of two kinds. Five at least, written in the main by the more mature and experienced in their respective fields, are on problems of general interest; the others are of more specialized character, factual rather than interpretative.

In the first group certainly belong "Psychiatry and the Social Sciences," by Frederick H. Allen; "A Rational Old Age Security Program," by Barbara N. Armstrong; "Crime as a Biological Reaction," by Olga L. Bridgman; "Industrial Change and Unemployment," by Frederick C. Mills; and "Limits to the Changing Functions of the American Family," by Arthur J. Todd. Emily Huntington's "British Health and Unemployment Insurance and Standards of Living"; "The

Problem of Social Investigation—the Method of Sidney and Beatrice Webb" by Webster Vannier; and "John Ruskin–John A. Hobson," by E. T. Grether, may probably also be regarded as belonging to this group.

Of the other type are: "The American Federation of Labor and Organization in the Automobile Industry since the Passage of the National Recovery Act," by Marjorie Ruth Clark; "The Growth of Care of the Indigent Sick and Aged as a Function of Government in California," by Malcolm M. Davisson; "A Chinese Green Crop Society," by Sidney D. Gamble; "The Self-Help Cooperatives in California," by Clark Herr and Paul Taylor; "Unemployment Relief in California under the State Emergency Relief Administration," by S. A. Mosk; "National Planning for Recreation in European Countries," by Emily Noble Plehn; and "Socio-Economic Conditions in Relation to Infant Mortality in Berkeley," by Frances M. Welch. One wonders, incidentally, why Wesley C. Mitchell, the author of the Foreword, thought the conclusions of the last writer would "surprise many readers." Rather it would appear that they confirm the well-known findings of the Children's Bureau that there is a close correlation between socio-economic conditions and the infant death-rate.

HAZEL KYRK

University of Chicago

The Dairy Industry and the AAA. By JOHN D. BLACK. Washington: Brookings Institution, 1935. Pp. xiv+520. $3.00.

This volume is one of the series of reports by the Brookings Institution on the operation and administration of the Agricultural Adjustment Act. The author's method is primarily that of description and explanation rather than of argument, and there is a paucity of conclusive statements on the numerous questions discussed.

Dr. Black's discussion of the development and administration of marketing agreements and licenses for fluid-milk areas leaves little to be desired. At least, he could not have gone much farther in presenting the facts without being accused of personal bias by either pros or antis. As it is, the complaints should be about equally divided.

Dr. Black discusses six alternative plans of milk-market control, ranging from public ownership and operation of the distribution facilities, at one extreme, to "open competition enforced with the aid of market information service, grading, inspection and all devices employed in the case of organized exchanges and auction markets." He

refrains from expressing a preference, but it seems a fair inference that he favors "collective bargaining under efficient and effective public supervision and control." But this would involve a large financial sacrifice for a principle, if it is true, as he suggests, that at least two cents a quart might be saved in many cities by public operation of the distribution facilities. The reviewer's opinion is that such savings could be made only after a long experience with municipal operation of this type of business, and by a considerable restriction of service.

Dr. Black believes that the emergency efforts of the AAA in respect to milk-market control would better have been "limited to voluntary agreements developed with the assistance of the Government with no public attempt to force the agreement upon those unwilling to participate." Price fixing, both for the emergency and for the longer term, should be avoided.

The author seems to deplore the fact that no plan for production control has so far been applied to dairy products. His assertion that the production-control plan "offered" to the dairy industry by the AAA failed of acceptance because co-operative association leaders, and others generally opposed to the adjustment program, whipped up opposition among a minority of dairy farmers, is open to question. At any rate, most producers with access to city markets might well have concluded that benefit payments under the proposed plan, plus the probable rise in prices resulting from the probable cut in milk production, would not have compensated them for the loss of income due to having a smaller quantity to sell. It was no accident that butterfat producers in the sections remote from markets showed greater favor for the plan to curtail production.

Dr. Black was an early advocate of the proposition that market prices are an inadequate or inefficient regulator of the production of farm products, or at least some of them. However, he apparently would put dairy products well down the list in order of need for production control by other means. "In a mostly unplanned economy," he says, "the problems of the dairy industry can be met without resort to positive production control devices, such as are represented by the present Agricultural Adjustment Act."

It may be surmised that the author would not have reached this conclusion had he not become confused about the "cow cycle." He suggests that what appear to be striking cyclical movements in purchasing power and in numbers of cattle, may not be cycles at all, or may have come about by accident, and in any case, have little or no relation to the production or prices of dairy products. This skepticism apparently

arises from the fact that the author has overlooked certain of the facts and has misinterpreted others. There seem to be ample grounds for believing that the "cow cycle" is by far the most important factor, other than changes in the general price level, accounting for the major variations in the prices of dairy products.

It is doubtful whether the author should have attempted to crowd a discussion of the entire subject of milk marketing into this volume. Most readers will find the chapters dealing with marketing difficult and less interesting than other sections of the book. Most of the discussion is in abstract terms. More facts pertaining to specific situations would help greatly toward a quicker grasp and more ready acceptance of the numerous generalizations which are made.

Dr. Black evidently feels that co-operative associations of milk producers engaged in collective bargaining with distributors have in many instances had too much power; that they have had a tendency to enhance prices unreasonably to the serious disadvantage of consumers; and that consumers have wrongfully been excluded from the process of price making. Nearly all will agree that the co-operatives have sometimes pursued unwise price policies. However, it seems that Dr. Black has exaggerated the degree of control exercised by the co-operatives, and has underestimated the part played by the consumer in making milk prices. It is safe to say that no price conference has ever been held by milk dealers and co-operatives at which the probable reaction of consumers to contemplated price changes has not been very seriously considered. That is not to say, of course, that the former practices may not be improved upon, as Dr. Black suggests.

Here, as elsewhere, Dr. Black has expressed his disbelief in the usefulness of cost data as a basis for prices or differentials. If his views on this matter are correct, large sums could be saved and little lost by scrapping the cost-finding departments throughout business. The fact that such work is continued on a large scale probably is explained by the fact that the executives believe the resulting data are a useful guide, particularly when they are interpreted in the light of practical business experience and common sense.

Dairy economists in particular, and many others, are heavily indebted to the Brookings Institution, to Dr. Black and his assistants, and to those who criticized the manuscript, for a decidedly worthwhile contribution to our common knowledge of the important questions considered in this volume.

LELAND SPENCER

Cornell University

Theodor Brinkmann's Economics of the Farm Business. English edition with Introduction and notes by ELIZABETH TUCKER BENEDICT, HEINRICH HERMANN STIPPLER, and MURRAY REED BENEDICT. Berkeley: University of California Press, 1935. Pp. x+172. $2.00.

This publication is a successful translation of Brinkmann's treatise entitled *Die Oekonommik des landwirtschaftlichen Betriebes*, which appeared in "Grundriss der Socialoekonomik" in the year 1922. Even though considerable progress has since been made by German thinkers, particularly Friedrich Aereboe, in this field of economic inquiry, Brinkmann's thesis nevertheless retains validity in its most essential features.

The first introductory chapter on "General Considerations of the Types of Farming" presents some basic concepts regarding the measurement of intensity of farming and the classification of farm enterprises into two main groups: the "types of land use" and the "branches of processing or refinement."

The second chapter analyzes the factors determining the "Levels of Intensity in Agricultural Production and the Orientation of Its Location." Brinkmann distinguishes four major factors: (1) the economic location of the farm, (2) the natural conditions of the farm, (3) the stage of development of the social organization, and finally (4) the personal qualities of the entrepreneur. Although this classification may appear conventional to the American student, he will find the treatment of these factors quite original and thought-provoking. The effect of the economic location on the costs of labor and means of production on the one hand, and the fact that the various types of land use require or profitably absorb various degrees of intensity (inputs of labor and capital per acre) on the other, determines, to a large extent, intensity and location of agricultural production. The dynamics of this multitude of tendencies and countertendencies is ably depicted. Of special interest in this discussion is the prominence of the problems of soil fertility and the intensity of fertilization—problems which are gaining rapidly in importance in American agriculture. The treatment of the influence of the development of social organizations is, perhaps unfortunately, limited to two strictly economic phenomena: changes in demand and technological advance.

The third and last chapter, a comprehensive synopsis of these various determinants, deals with "Systems of Farming or the Orientation of the Locations of the Lines of Production." The interplay of two groups of antagonistic forces—the forces of differentiation and the forces of integration—originates the farming systems and directs their

geographical distribution. The tendency for differentiation results from the comparative advantage of a locality for a certain type of production. The forces of integration derive their strength from the producer's "desire for the most continuous employment of labor and equipment," from "the effort to get the best feasible utilization of all the fertility elements of the soil," and from the requirements of indispensable converting enterprises (such as livestock). The degree of intensity is governed by a similar interplay of antagonistic forces, those making for extensification and those making for intensification. Transportation costs, the specific value (*Wertigkeit*) of the products, the inherent labor and capital requirements of enterprises and soil types, are some of the major factors determining direction and strength of these forces.

This brilliant study has the earmarks of a pioneer venture. It develops some very useful concepts, outlines promising approaches to highly intricate problems, and opens up new avenues for further research. But the emphasis in the discussion of the various factors is not adequately balanced in some places. Certain factors are overstressed, while others are neglected. Since the time the manuscript was completed (1912), several problems which are oversimplified and slightly misconceived in the present study have, of course, been cleared up considerably in subsequent years by the author himself, as well as by other students, particularly Aereboe (this refers most specifically to the treatment of the "Economic Location" and its components).

Inasmuch as most of the American publications in the field of farm management and types of farming so far have been either purely descriptive or confined to rather narrow and specific problems, the present work will be of special interest to economists in this country; and it can hardly fail to be stimulating and challenging in its approach to the complex problems of intensity of agriculture, types of farming, and comparative advantage and alternative opportunities of enterprises.

RAINER SCHICKELE

Iowa State College

Length of Life. By LOUIS I. DUBLIN and ALFRED J. LOTKA. New York: Ronald Press Co., 1936. Pp. xxii+400. $5.00.

For the past ten or fifteen years the research laboratory of the Metropolitan Life Insurance Company has been publishing some excellent researches on population, births, deaths, length of life, and kindred

topics. A good many of these have been pulled together from the various bulletins and from the scientific magazines and welded together into a volume carrying the title *Length of Life* under the authorship of the directors of this laboratory. The title is a popular one and describes the central theme only. The surrounding material deals with the new researches in a fairly large section of population research. The volume includes a good deal of tabular data in detail which did not appear in the bulletins issued by this research group.

The presentations of these researches are quite interesting and have a good deal of social significance. For instance while about 750,000 (figures mine) new lives were added to the population of the United States in 1933 as excess of births over deaths, or 6 per thousand population, yet the population is not maintaining itself in that 1,000 female babies born in 1933 will in the course of time be replaced by only 998 such infants, should the conditions of life and death remain as they are at the present time. The explanation of this apparent contradiction lies in the phenomena of age distribution. The mysteries of the variations of age distribution in all of their ramifications are very interestingly set forth by the authors. The point is important, because unless it is taken into consideration population policies will be based upon erroneous considerations, for we are much nearer a decreasing population than is apparent in the yearly figures of population increase. As to the expectancy of life, the most favorable state is South Dakota with an expectancy of sixty-four years. The least favorable is Arizona, where one may expect to live only forty-seven years. With all of the health work of the city and the paucity of it in the open country the farmer lives longer than the city man. The expectancy is sixty-two years for rural male inhabitants and fifty-seven years for the urban male. The difference would probably be greater in a comparison of the large city with farmers only.

The expectancy of life in Massachusetts in 1850 was only about thirty-eight years; in Sweden for 1755–76 it was thirty-four and one-half years; and in Breslau, Germany, in 1690 it was thirty-three and one-half years. The authors estimate the money value of man at twenty years of age as $30,000. Their maximum value appears at twenty-five years of age when the money value is $32,000. At sixty-five, the age at which the Townsend Plan applies, the present worth of average net future earnings is about $4,000. Presumably the calculations were made before the great depression of the 1930's and no doubt the presence of a large number of unemployed or lowering of the standard of living would affect these calculations.

This book probably represents the measurement side of social science at its best. The information is in general rather exact. In almost all cases it is expressed in numerical form. Social science in the actuarial and population fields has reached a point where prediction is undertaken with considerable assurance. Over a fairly wide range of phenomena the predictions give the appearance of a high degree of reliability. This is not to say that there are not errors. Indeed, the authors might well have been more critical in this respect, particularly of the work of Raymond Pearl, Karl Pearson, and W. R. Macdonell. But the book is not so much a critical review as an exposition of new researches on the firing line of a large sector of population study. The authors bring the atmosphere of expansion and exploration rather than that of a critical compendium of all that is known in this field. Their work, however, is quite definitive and precise and not to be classed with the merely suggestive writing so common to much so-called exploration work.

WILLIAM F. OGBURN

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Einführung in die mathematische Statistik. By OSKAR N. ANDERSON. Vienna: Julius Springer, 1935. Pp. v+314. Rm. 22.

The writing of a book on modern methods of statistical analysis is a task of appalling difficulty, for the last two decades have witnessed such a rapid development of the subject as to constitute almost a revolution, and the record of it is to be found only in a mass of scattered original memoirs which are noted for their diversity and complexity.[1] Moreover, there exists no manual which could serve as a guide in organizing the new material. True, we have Professor R. A. Fisher's widely used reference book, *Statistical Methods for Research Workers*, in which some of the newer methods are described and applied to statistical data. But Fisher does not give formal proofs for his formulas, and without a knowledge of the derivations the research worker cannot be certain of the legitimacy of the applications of these methods to his own problems. The mathematical proofs are, however, only to be found in a mass of original papers which are incomprehensible except to the expert.

He who would write a text on modern methods of mathematical statistics must, therefore, not only master a vast and difficult literature, but also use judgment and discretion in selecting the topics and

[1] Thus Professor Paul R. Rider, in his "Recent Progress in Statistical Method," *Journal of the American Statistical Association*, XXX (1935), 58–88, lists 177 memoirs published in 1933 and the early part of 1934.

in organizing them into an organic whole. Not the least of his problems is the determination of the mathematical key in which the book is to be written, for the same problem may often be attacked both by simple and by advanced methods.

Professor Anderson is well qualified for the task. Known to English-speaking statisticians primarily for his contributions to the "variate difference method" and to the rôle of correlation analysis in the study of the business cycle, he has been a close student of the latest developments. A loyal follower of Tschuprow, Bortkiewicz, and Lexis, he is also an admirer of R. A. Fisher and of the contemporary English statisticians. For years a "pure" statistician, he is now director of the newly founded Institute for Economic Research of the University of Sofia, Bulgaria. He has, therefore, a practical as well as a theoretical knowledge of statistics.

The task which Professor Anderson set for himself was to provide an introduction to the modern methods of mathematical statistics while employing only algebraic methods, and avoiding all reference to the differential and integral calculus. By restricting the scope of the book to a comparatively small number of topics, by considering only the more elementary notions of each topic, and by omitting all reference to the problems which arise in the application of the theory, he has managed to accomplish his task with considerable success. An important feature of this book are the references to the original memoirs which enable the reader to see the sources of the author's inspiration.

Although the book contains an introduction to the mathematical theory of sampling which underlies Fisher's *Statistical Methods*, English-speaking statisticians will not find this its greatest merit;[2] they will consult the book primarily for the excellent introduction which it gives to the methods of Tschuprow and to the theory of sampling from a finite universe, of which the theory of sampling from an infinite universe is a special case. In the reviewer's opinion, the author has erred in rejecting the calculus and in the consequent overemphasizing of the general formulas; for the special case of sampling from a normal universe, which can be treated quite briefly and elegantly by the methods of the calculus, not only has obvious didactic advantages but is far too important a case to be so cavalierly relegated to a minor place. Moreover, the rejection of the calculus has prevented the author from deal-

[2] The best brief introduction to the modern mathematical theory of statistical inference known to the reviewer is that by W. Edwards Deming and Raymond T. Birge, "On the Statistical Theory of Errors," *Review of Modern Physics*, VI (1934), 119–61.

ing satisfactorily with all topics which depend on the notion of a continuous frequency distribution. Thus he gives no discussion of the Pearsonian and of the Gram-Charlier systems of frequency curves and only an incomplete treatment of Fisher's "method of maximum likelihood."

Professor Anderson has written a valuable and scholarly introduction to the modern methods of mathematical statistics. It should be translated into English.

HENRY SCHULTZ

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Protective & Preferential Import Duties. By A. C. PIGOU. London: Macmillan & Co., Ltd., 1906; reprinted by London School of Economics and Political Science, 1935. Pp. xiv+117. 6s.

Students of economic theory and of fiscal problems will be grateful to the London School of Economics and Political Science for having included this book in its new series of reprints on scarce works on political economy, for, though small, it is one of the most brilliant contributions to the discussion of protection versus free trade. It brings together the substance of those admirable articles which Professor Pigou contributed to the *Fortnightly Review* of January, 1904, and to the *Edinburgh Review* of October, 1904, and January, 1906, and of his *Riddle of the Tariff*, published in 1903, and arranges them as a systematic whole.

It is indeed the irony of fate that this book, containing as it does the intellectual weapons which riddled the protectionist arguments of Joseph Chamberlain in 1904, should be reprinted at a time when Great Britain is rapidly abandoning the last vestiges of free trade. It is certain, however, that whatever be the ultimate fate of free trade and the system of social, political, and moral values of which it is an outgrowth, the theoretical points which Professor Pigou raises in this book and the techniques of measuring the effectiveness of the tariff which he develops therein will continue to exert a powerful influence on economic thought. Indeed, the theory and techniques in question are the simplest and most practical tools still available for determining the effect of a duty on the conditions of supply.[1]

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[1] See Henry Schultz, "Correct and Incorrect Methods of Determining the Effectiveness of the Tariff," *Journal of Farm Economics*, XVII, No. 4 (1935), 625–41.

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6